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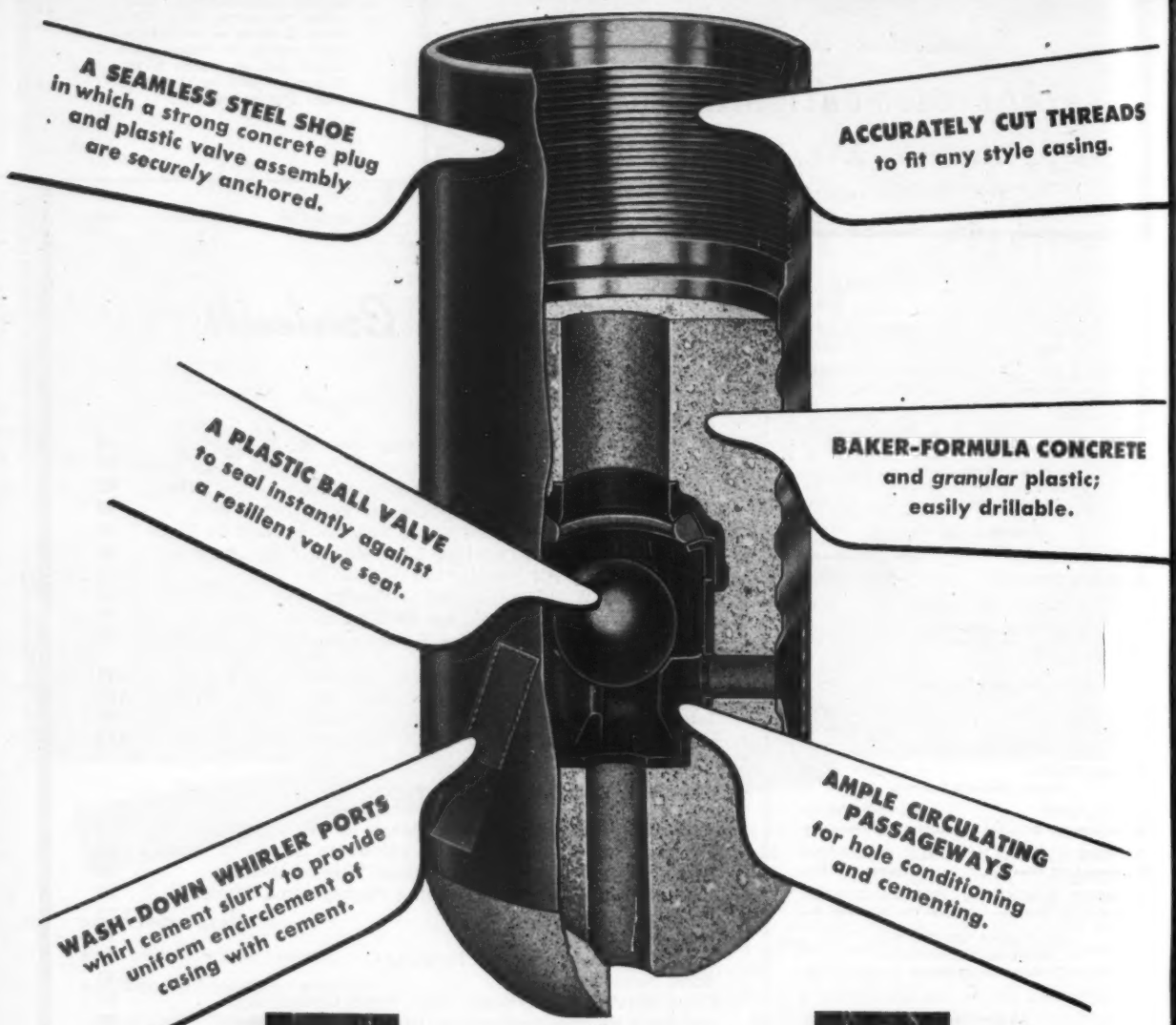
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Fuel-Oil Program

WITH the heating season nearly over, it is well to examine the methods used in meeting fuel-oil demands and to plan for the future. Early in the winter it became apparent that many distributors would not be able to meet the needs of their customers, and there was pressure for government controls to apportion supplies. Instead, a law was enacted under which the petroleum industry adopted a voluntary allocation program. What are the results?

It has been essentially a "share the misery" plan. No additional petroleum has been provided. To the extent that distillate yields have been increased at the expense of an adequate supply of gasoline for next summer, the move is simply out of the frying pan into the fire.

As a temporary expedient, and from the humanitarian standpoint, this share-and-share-alike plan has merit. But it has political and economic dangers which should be recognized before the industry commits itself to a program for next winter.

A serious defect is that the program carries no reward for the foresighted and the ingenious, no penalty for the improvident. The Johnny-come-lately oil-burner promoter, and the distributor who oversold his fuel-oil market, get a free ride at the expense of those who were prepared to meet the requirements of their own customers. In Bible times the foolish virgins who failed to husband their oil had to take the consequences; the lesson is still good.

Some oil companies, large and small, voluntarily curtailed their market expansion and incurred extra manufacturing and transportation costs to meet their commitments, only to find their supplies tossed into the common pot. It is a case of virtue being its own—and its only—reward. If this "pool" concept is continued another winter, where will be the incentive for any supplier to exert himself? The result may be less oil instead of more.

Nor does this program do much toward checking the demand for fuel oil. It holds out a false sense of security, an implication that somebody will see to it that every oil burner is supplied somehow. If everyone—consumer and distributor—were on his own, new installations and new supply contracts would be made with far greater caution.

There are political dangers, too, in this voluntary allocation program. It was not free from political influence, as members of Congress continually intervened to make sure their constituents got good treatment. It fosters the assumption that the Government has a responsibility to see that all get oil who want it. The next step is government control, and the pattern is ready-made for the Government to take over.

The sooner the oil industry gets away from this quasi control and back to the economic incentives and self-correctives of individual enterprise, the better for all concerned.

Industry, Military Officials at Odds Over Krug's Synthetics Program

by Bertram F. Linz

WASHINGTON.—The House Interstate Commerce Committee will open hearings this week on Chairman Charles A. Wolverton's bill to effectuate Interior Secretary Krug's proposal for construction of three synthetic-fuels plants, but a preview of the testimony it will receive from industry and Government witnesses was given last week before a House armed services subcommittee.

The points of view of the three most interested groups as brought out before the subcommittee were:

Industry representatives declared Krug's plan to produce 2,000,000 bbl. daily of synthetic fuel would cost $17,000,000,000 instead of $9,000,000,000 as he claimed; the industry itself will develop synthetics as rapidly as economic factors dictate, and stockpiling by the military would be cheaper and more dependable over the short term.

Interior Department officials and experts declared the country could no longer depend upon natural crude for both civilian and military needs; Bureau of Mines research has reached the point where commercial plants are feasible, and the Government has no intention of going into the oil-producing business but plans only to help the industry get synthetics started.

Military Prefer Synthetics

Military officials stated no decisions have yet been reached but they preferred synthetic production to stockpiling, which would involve dependence upon currently precarious sources in the Middle East.

Back of all the studies that are being made of synthetics and stockpiling is the threat of loss of Middle East oil, and Subcommittee Chairman Dewey Short of Missouri expressed flatly his belief that the Middle East supplies will be cut off pretty soon.

In an appraisal of the possibilities of synthetic-oil production, E. V. Murphree, president of Standard Oil Development Co., which actively is engaged in synthetics research, stated that natural gas offers the best immediate opportunities.

Murphree said that, assuming 10 trillion cubic feet are added yearly to the reserves and consumption builds up to 6.1 trillion, and making further allowance for increased industrial and heating use, there will be enough natural gas available to produce some 500,000 bbl. daily of oil products. Our coal reserves are capable of meeting all liquid-fuel requirements for some centuries; there is a potential of at least 100 billion barrels in the Colorado shale deposits alone, and there are large potentials in the tar sands, the Athabaska sands in Canada being estimated to represent a potential reserve of 100 to 200 billion barrels.

Discussing the question of costs, Murphree said it requires 5.7 tons of steel per barrel of products daily for maximum distillate yield from crude oil and 7.8 tons per barrel for maximum gasoline yield for crude oil. These figures cover the steel needed for production, transportation, refining and delivery of Gulf Coast oil to the consuming market in New York. Comparable figures for synthetic production are 7.1 and 7.9 tons for natural-gas products for delivery at New York; 4.6 and 5.2 tons for coal products which would be consumed locally and involve no transportation, and 5.7 and 7.4 tons for oil-shale products refined and consumed on the Pacific Coast.

Costs Estimated

The capital investment, he said, would be $4,300 and $6,500 for petroleum, the first for maximum distillate yield and the second for maximum gasoline, compared with $7,400 and $8,200 for natural gas, $7,600 and $8,500 for coal, and $6,100 and $8,400 for shale. As much as $2,900 per barrel might have to be added to the coal figures for housing and $900 to the shale estimates, he said.

Based on going prices of $2.78 per barrel for crude and 10 cents per thousand cubic feet for natural gas and estimates of $3.20 per ton for coal and $1 per ton for shale, and allowing 5 per cent for amortization and 10 per cent for return on investment all along the line, gasoline from crude, allowing credit for byproducts and including product transportation, costs 14.1 cents per gallon, as against 12.8 cents for gasoline from natural gas, 16.6 cents from coal and 16 cents from shale. The figures are based on a gasoline with an octane-number level to satisfy a 10 to 1 compression ratio engine capable of giving about 30 per cent more miles per gallon than present engines, which it is believed will be required by the time there is any large synthetics production.

Contending that the industry, already active in the field, will go into synthetics production as rapidly as the economic situation requires, Murphree said that on the basis of his tabulation, if 500,000 bbl. of products are to be produced daily from natural gas, 500,000 from shale, and 1,000,000 from coal, as indicated in the Krug proposals, the cost would be roughly $17,000,000,000.

But, he said, if 2,000,000 bbl. daily of synthetic oil are sought for security purposes, it will mean that capacity must be created that either is not used for supplying civilian needs or capable, if so used, of being readily transferred to production for war.

"Once a civilian use of oil products is started, it is very difficult to discontinue," he warned, pointing out in the last war it was possible by rationing to take only about 500,000 bbl. daily out of civilian consumption.

A better way of meeting emergency military requirements, he said, would be by a stockpiling program under which 500,000 bbl. daily would be stored over a period of 5 years, at which time the stockpile would be about 910 million barrels. Taking oil products at $4.20 per barrel and tankage at $1.30, the cost of the 5-year program would be $5,000,000,000.

"The stockpiling program," Murphree explained, "has the advantage that oil products will be supplied from the most economic sources. If creation of synthetic-fuel capacity is needed to meet requirements, the installation of such capacity would naturally follow. A stockpiling program such as that outlined is believed to be definitely sounder for meeting war-emergency requirements than a program involving uneconomic erection of large-synthetic-fuel capacity. It should be realized that the oil industry will need some time to prepare for such a stockpiling program."

Murphree said the storage should be above ground but well dispersed, and it would not be necessary to resort to underground storage to prevent enemy attack since, while storage here and there might be destroyed, dispersal would avert any substantial losses. On the other hand, he pointed out, one bomb could put a large synthetics plant entirely out of operation.

Guard Against Competition

Short indicated that if any legislation for stockpiling is enacted by Congress it will be surrounded by safeguards against any disposal of supplies in commercial channels.

"I don't think private industry needs to entertain any great fears from this committee," he said, "because if we do build a stockpile I don't think it would be allowed to go into competition with private industry."

Presenting the military viewpoint, Col. G. H. Vogel, executive officer of

the Armed Services Petroleum Board, emphasized that no decisions will be made until after the military petroleum advisory committee reports, sometime before the end of June, the results of studies now being made into all phases of future military supply.

Vogel made it clear, however, that present thinking is entirely along the line of synthetics production which, he said, would provide a continuing and added quantity of fuel, conserve petroleum, accomplish a partial decentralization of the petroleum industry and provide means for the manufacture of products in areas remote from supplies.

He indicated also that the military do not favor stockpiling because of possibilities of an emergency before a large stockpile could be built up.

The military believe the Interior Department should continue its development and experimental work and build prototype plants until the industry catches up, and that the department should be assisted to complete surveys of possible sources of raw materials and sites for plants. The Bureau of Mines, Vogel disclosed, is covering all phases of the synthetics field, currently being engaged in work on the low-temperature synthesis of Alaskan coals.

Vogel summed up the military viewpoint as being that synthetics production appears to be the best bet for long-run security, but stockpiling may be considered as a way of bridging the gap until synthetics output is at the national-security level.

Equal Access to Latin-American Oil To Be Sought in Bogota Conference

WASHINGTON. — Proposals which might pave the way for the opening of the oil resources of Latin American countries to development by United States companies have been drafted by the economic and social council of the Pan American Union for consideration at the Inter-American economic conference which will open in Bogota, Colombia, March 30.

The Union's draft calls for affirmation by the American republics of the principles of equality of access of raw materials, and for an Inter-American Economic and Social Council which, among other things, would promote and coordinate studies of the natural resources of the Latin American countries, including oil, and examine, at the request of the interested countries, possibilities and conditions for the establishment of new industries, especially those "conducive to a more complete utilization of natural resources."

The proposals also call for financial cooperation with Latin America in financing economic development, both through loans from the International Bank for Reconstruction and Development and by private investment.

The Pan American Union draft was released by the State Department with the comment it does not commit any of the interested governments in any way. At the same time, it disclosed that several governments, including the United States, already have entered specific reservations against various provisions.

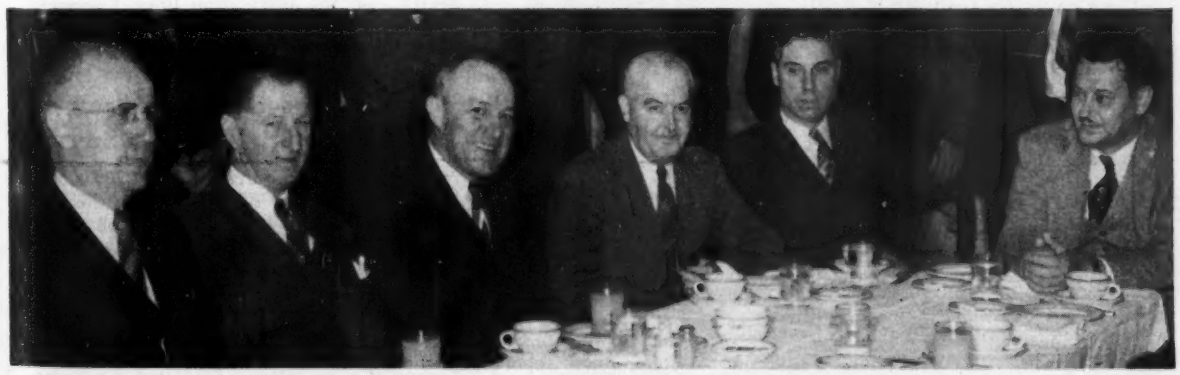
The United States reservations, the department stated, are aimed at provisions relating to assurances and safeguards for private American enterprises abroad, which are not considered sufficiently broad to protect United States investors adequately. An invitation was extended to American citizens, businesses, and organizations to express views concerning the draft document, and assurance was given that those views would be taken fully into account in the preparation of instructions for the United States delegation.

At the department it was explained that the United States wants to follow out the general policy of nondiscriminatory treatment abroad for private capital.

The delegation at Bogota, it was said, will take the view it is to the best interests of the other American republics to develop their natural and other resources by the best method known, which is by private industry operating in a highly competitive atmosphere, and that anything that would discriminate against investment or activity of private foreign capital is something that should be altered.

The department made suggestions to the Pan American Union during the drafting of the proposals, but many of them were not incorporated in the document, and the reservations were filed to insure that there would be discussion of these matters in the conference.

INDUSTRY, COMMUNICATIONS OFFICIALS DISCUSS RADIO NEEDS IN PETROLEUM



Needs of the petroleum industry for a permanently assigned block of frequencies, together with other problems, were discussed by George E. Sterling, new Federal Communications Commission member, and oil-company communications engineers and officials during the commissioner's 3-day visit last week in the Houston area. Among the group at a breakfast given by the Petroleum Industry Electrical Association for Sterling were: George S. Turner, Washington, assistant chief FCC engineer; Sterling; F. W. Littell, Shell Pipe Line Corp., chairman of the American Petroleum Institute's radio committee; J. F. Collerain, Houston Pipe Line Co., P.I.E.A. president; H. A. Rhodes, Humble Pipe Line Co. communications engineer; and Joe McKinney, regional FCC manager in Houston. During his visit, Sterling was taken on two trips to view radio facilities of West Production Co., which has one of the most elaborate networks in the industry. The group visited West's operations in Houston, at the West's ranch near Carrizo Springs, and at two drilling rigs, James West 1 Timberlake in Bexar County, and J. M. and Wesley West 1 Harrison in Grimes County

Report Asks Review of ERP Oil Needs, New Ways to Meet Them

WASHINGTON.—A full view of the petroleum requirements of the European recovery program and development of alternate methods of meeting them in the event all the "ifs" on which the Marshall Plan is predicated do not eventuate was called for over the weekend by the House Interstate Commerce Committee in another of its "progress reports" on its petroleum investigation.

In its report, released as the Senate prepared for at least a week's debate on the ERP legislation, the committee estimated that fully one-fourth of the $16 billion required for the program will go for petroleum and petroleum equipment. The unknown factors in that equation, it said, are the probable expenditures for petroleum production and consuming equipment to be supplied directly or indirectly from United States sources.

The report pointed out that much dependence is placed on the Middle East as a source of the oil needed by Europe, but commented that the necessary development of the Middle East area "may be accomplished only if there is peace."

Middle East a Question

"It is not at all clear what reliance can justifiably be placed on the continuance and expansion of this source of supply, at least in the amounts and within the time indicated," it said.

"The securing of this additional production within the times scheduled is a necessary requisite to meeting the petroleum requirements of the ERP even in the reduced amounts as estimated by the State Department. The State Department estimates of availabilities of crude from the Middle East were predicted upon the commercial plans of the oil companies for expanding their production in the Middle East and their ability to meet the schedules proposed.

"The inability to increase production at these scheduled rates or to provide expanded transportation facilities at the scheduled rates, would be a serious factor for further consideration in connection with the recovery program."

The committee explained it was unable to secure definite figures on what is involved in expansion of the Middle East supply but pointed out it will come at the same time as a tremendous program by American companies for construction in the United States, and the full impact in terms of steel for both domestic and foreign expansion is not yet clear.

In the light of possibilities of not meeting the world-wide expansion of crude supply or refining facilities within the time requisite to meet the estimated European requirements, it said, consideration of alternative means is pertinent. The State Department has been requested to submit a full discussion of such alternative plans but has not yet supplied it.

A full review of all proposals which depend on increased European use of petroleum is in order, the committee said, "so that the United States does not fail in any obligations it may assume in connection with the proposed ERP."

"If, for example, it should be determined that complete reliance can not be had upon the Middle East as a source of supply—political phases over which this committee does not have jurisdiction—or if it is determined that materials are unavailable for the ambitious world facility-expansion program within the time limits needed — a further subject not within the province of this committee—there still is adequate opportunity for review not only of the contemplated European use of petroleum as a source of energy, but also of the other portions of the recovery program dependent on petroleum," the report concluded. "If such determinations are made, alternate sources of Europe's energy well may be explored, and attention given to possibilities of greater use of coal, either through their own greater production or continuation of imports."

More Steel Asked For L.P.G. Storage Systems

AUSTIN.—The report of W. J. Murray, Jr., chairman of Texas' emergency fuel commission, to the National Petroleum Council's steel-requirements committee emphasizes the need for steel to provide additional consumer storage for liquefied petroleum gases.

Murray, a member of the Texas Railroad Commission, reported to the NPC committee that an allocation of 65,000 tons of steel is required for L.P.G. storage facilities, mostly at the consumer level.

Murray said Texas now has about 300,000 consumer storage systems with an average capacity of 175 gal. This total of 52,300,000 gal. is only a 17-day supply during winter peak demands. This average of consumer storage should be raised to a minimum of 300 gal. and preferably 500 gal., in addition to increasing bulk storage.

Louisiana March Allowable Again Sets All-Time Record

The March allowable for Louisiana fields has been set at 513,765 bbl. daily, an increase of 5,773 bbl. over the February figure.

The new allowable is another all-time high in an unbroken series of records which began more than 2 years ago. North Louisiana fields represented 5,010 bbl. daily of the total increase for March.

The daily allowable for Oklahoma as set by the Corporation Commission for March remains the same as the previous month, 410,000 bbl. Allowable increases were assigned to 20 pools. Two new pools were added to the allocated list, and 13 pool quotas were reduced.

The Kansas daily allowable has been set at 290,000 bbl. by Kansas Corporation Commission. This represents no change over the previous month's allowable.

Special Train to Denver Convention Is Planned

A special train to the joint convention in Denver of the American Association of Petroleum Geologists, the Society of Exploration Geophysicists, and the Society of Economic Paleontologists and Mineralogists is being arranged by the Houston Geological Society.

A committee headed by Carleton D. Speed, Jr., is in charge of arrangements.

The route will be via Dallas, Fort Worth, Wichita Falls, and Amarillo on the Burlington lines. Connections may be made at these points by persons with reservations on the special.

Increased Imports Are Essential, Majewski Says

Imports averaging 1,200,000 bbl. daily must be coming into the United States by 1951 or the nation will face rationing again, according to B. L. Majewski, chairman of the District 2 regional advisory committee of the National Petroleum Council.

Majewski made the prediction March 1 at a meeting of the committee in Chicago, called to consider ways and means of meeting fuel shortages.

"We are 400,000 bbl. short daily now," said Majewski, who is vice president in charge of marketing of Deep Rock Oil Corp. "Consumption this year will be 6,250,000 bbl. daily. Next year it will be 6,800,000 bbl. daily."

this week

INTERNATIONAL—South America's longest pipe line, to carry natural gas from Comodoro Rivadavia fields to Buenos Aires, being laid at rate of nearly 2 miles per day. . . . ¶Creole completes negotiations to keep all royalty crude oil, paying government 19 cents per barrel. . . . ¶Design changes announced for new Creole refinery on Paraguana Peninsula. . . . Changes to provide greater output of heavier oils and less gasoline. . . . ¶Russians reported moving hydrogenation plants to Siberia from Russian zone of Germany . . .

PIPE LINE—Texas Eastern Transmission Corp. expected to file application for authority to build 26-in. line to parallel Big Inch from Longview, Tex., to Pittsburgh. . . . Cost of the new natural-gas line estimated at $150,000,000. . . . ¶Texas Pipe Line Co. awards three contracts for crude-oil lines in West and Southeast Texas. . . . ¶United Gas Pipe Line Co plans $14,000,000 expenditure in 1948.

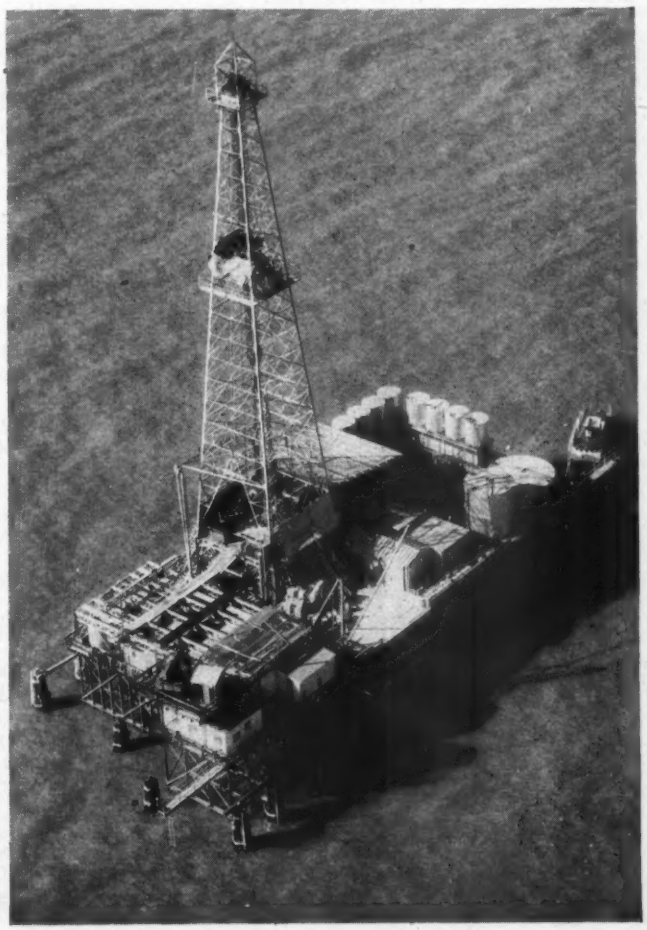
TRENDS—Domestic crude production jumps 47,305 bbl. daily to set new record for fourth consecutive week. . . . Output marks continuation of upward trend, passing 5,400,000 bbl. for the first time in history. . . . With exception of week ended January 31, new record high reached in every week this year. . . . ¶Even with soaring production, economists predict future need for greatly increased imports. . . . ¶Gasoline stocks building up above 1947 level, in spite of increased yields of distillates. . . . Gain accounted for by greatly increased runs to stills. . . . Stocks on February 21 total 109,886,000 bbl., against 101,832,000 bbl. in 1947. . . . Sharp reduction in stocks and tight gasoline situation seen with arrival of warmer weather as a result of anticipated record demand. . . .

GOVERNMENT—Mississippi House of Representatives passes and sends to senate bill creating state oil and gas regulatory board. . . . Opponents force amendment limiting board's authority to prescribe well spacing. . . . ¶State Department reveals plans to seek access for American companies to oil development in Latin America. . . . Companies and organizations asked to submit ideas on proposals to be made at Pan American Union conference in Bogota. . . .

FOREIGN AID—House committee calls for review of oil needs of European countries. . . . Seeks new ways to meet foreign needs in event Middle East is eliminated or restricted as source of supply. . . .

SYNTHETICS—Cities Service Oil Co., M. W. Kellogg Co. announce merger of synthetic-fuel research program. . . . ¶Industry leaders, military officials remain at odds over Interior Secretary Krug's proposal for government-assisted synthetic-fuel industry. . . . Military leaders fear stockpiling efforts might be blighted by cutting off of Middle East supplies. . . . Industry officials say Krug plan would cost 17 billion dollars, declare industry will develop synthetics as rapidly as economic factors dictate. . . . Stockpiling described as more dependable and cheaper.

REFINING—Republic Oil Refining Co. purchases Texas City refinery from War Assets Administration for $2,300,000. . . . Agrees to spend $250,000 within next 6 months. . . . Midland Cooperative Wholesale Co. announces plans for $500,000 expansion program at Cushing refinery. . . .



Now drilling below 12,600 ft. is Magnolia Petroleum Co. 1 Eugene Island, Block 45, the company's third wildcat in the Gulf of Mexico. Two previous tests, a deep hole and a shallow test, were completed dry. Despite the fact that no commercial oil or gas have been found in the area, where the company already has spent more than $9,000,000, Magnolia plans to drill six additional wildcats in its attempt to discover new fields. Drilling on the well shown here, located off the Louisiana coast, was begun October 15, 1947

Cities Service, Kellogg Announce Merger of Synthetics Programs

by Arch L. Foster

NEW YORK.—Merger of the synthetic fuel research programs of Cities Service Oil Co. and M. W. Kellogg Co., petroleum engineers, was announced here by A. P. Frame, president of Cities Service Research & Development Co., and L. H. Harvison, vice president of Kellogg. The Kellogg company is prepared to license synthetic fuel plants for operation of the process in behalf of both companies.

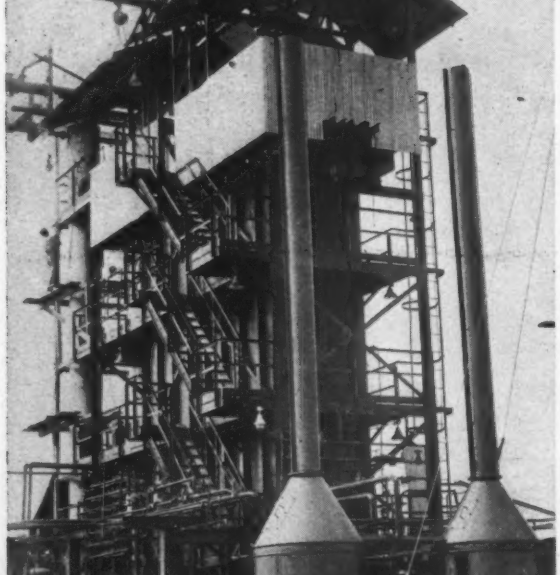
This association of interests and activities has been in effect since 1946 and is the result of similar efforts on the part of each company over a period of several years in the development of synthetic-fuel and chemical processes, Harvison pointed out. The process is the result of advances made in developing the earlier German Fischer-Tropsch process which was begun in the 1920's. First American work on this reaction was begun by Kellogg in middle 1930's, Harvison stated, and has continued up to the point of building and operating a large-scale pilot plant at Kellogg's Jersey City research and development plant.

A. P. FRAME

L. H. HARVISON

Frame is president of Cities Service Research & Development Co. Harvison is executive vice president of M. W. Kellogg Co.

Early in this work Kellogg introduced the now familiar fluid catalyst principle into the process, which offsets much of the disadvantage resulting from the German fixed-bed system with its large number of huge reactors and consequent large capital investment. Adoption of a finely divided, economical, iron catalyst has also pushed American practice far ahead of anything attained in Germany.



One of the experimental units in the synthetic-fuel development program, located at the Cities Service Oil Co. refinery at Lake Charles, La.

The Cities Service organization has pioneered in the chemistry of natural gas and its derivatives since 1926, when the oxidation of natural gas processes were developed and installed at the unique plant at Tallant, Okla., for the manufacture of many types of oxygenated hydrocarbon derivatives, Frame said. More recently a large pilot plant has been built at the refinery at Lake Charles, La., where major-caliber research and development on this process is being carried on. Cities Service has wide experience in operating processes using the fluid catalyst principle, having three fluid catalytic cracking units at Lake Charles, and is now installing similar units at its East Chicago refinery.

The Cities Service company is now concentrating on the phase of the program which deals with the byproduct chemicals formed during the process, their isolation and purification, and improvement of process and product, all carried out in collaboration with Kellogg and following the joint plan.

One of the major studies is the reconversion of oxygenated products to hydrocarbons, and estimates made are based on adding this hydrocarbon production to the main hydrocarbon yield obtained.

The Cities Service interests are among the largest producers of natural gas in the country, having produced 154 billion cubic feet of gas during 1947, Frame stated. The company's gas reserves are one of the country's largest and are an important potential source of synthetic fuels and other products.

The cost of producing a synthetic crude oil is comparable to the price of crude at present, Harvison said. The synthetic crude will have a gravity of about 56° A.P.I., will contain up to 85 per cent motor fuel of above 80 octane number, and the remainder of diesel fuel or distillate fuel range. By comparison, a typical natural crude may show 25 per cent each of motor fuel and distillate fuels, and 50 per cent of heavy residuum, Frame explained.

Producing synthetic crude will require about twice the investment needed for drilling wells to get the same production of natural crude, it was stated. Cost of a synthetic-fuel plant now is estimated to be about $4,000 per daily barrel of hydrocarbon product. Scarcity of steel supply over and above that needed for drilling wells and other going operations probably makes it inadvisable now to build a synthetic fuel plant, as steel already on order for well-drilling probably will not be received before 1950 or 1951, Frame stated.

Cities Service is giving close attention to the matter of the most satisfactory location for a commercial plant operating on its process, to be built when the economics of the industry warrants it.

Sun Seeks Permit

HOUSTON.—Sun Oil Co., Beaumont, has filed application with the Army Engineers office in Galveston for a blanket permit authorizing all structures and work necessary for oil development on eight state tracts in an area totaling 5,120 acres about 13 miles northeast of Galveston.

50 Billion Barrels of New Oil in Next 20 Years Seen by Knight

MORE than 50 billion barrels of crude oil must be discovered in the United States during the next 20 years in order to meet anticipated demands, but there are good prospects that this will be done, E. T. Knight, petroleum economist of Atlantic Refining Co., told the Philadelphia district of the American Society for Testing Materials February 24.

Departing from the usual practice of economists in sticking to short-range predictions, Knight ventured to forecast what the oil industry will be like 10 years and 20 years from now.

During the next 10 years, he said, demands on the United States oil industry for petroleum products will average 7,020,000 bbl. daily; imports will exceed exports by 360,000 bbl. daily; the oil industry will find and develop nearly 26 billion barrels of crude oil.

Admitting that any forecast for the decade following that is subject to great error, Knight said that between 1958 and 1967 demand will average 7,590,000 bbl. daily; imports will exceed exports by 540,000 bbl. daily; and the oil idustry will be required to discover and develop 25 billion barrels of crude oil.

How these predictions compare with actual operations during the previous decade is shown in detail in the table at the bottom of this page.

Consumption Up 61 Per Cent

If the oil industry is to supply fully the requirements of its domestic consumers during the next 10 years it must make available an average of approximately 6,770,000 bbl. daily of petroleum and related products, Knight said. The demand, which should average upwards of 6,075,000 bbl. daily during the next 3 years, will increase to something over 7,490,000 bbl. daily by 1957. That volume of consumption would be 61 per cent, or 2,565,000 bbl. daily, greater than the average consumption during the preceding decade. During the fourth quarter of 1947, domestic consumption averaged 5,767,000 bbl. daily.

Suggesting that the United States may not have unlimited access to foreign reserves, Knight assumed that during the next 10 years imports would average 610,000 bbl. daily, which is 365,000 bbl. daily greater than the 245,000 bbl. daily imported during the last decade. In addition, he expected that exports, chiefly specialties and lubricants, would not drain United States reserves to the extent that they have in the past. In contrast with net exports of 190,000 bbl. daily, the average for the past 10 years, he forecast net imports of 360,000 bbl. daily during the coming decade, or a gain of 550,000 bbl. daily in the supply available to domestic consumers.

Gas Products Needed

"An increasing portion of the long-term requirements will be supplied by the production of natural gasoline and related products," Knight said. "This source of supply is expected to increase to an average of 540,000 bbl. daily in the coming decade, 300,000 bbl. daily more than the average production in the 10 years just ended.

Turning to crude reserves, Knight said: "If the forecasts of supply from the foregoing sources are realized, the oil industry will be required to produce crude oil at a daily average rate of approximately 5,870,000 bbl. during the next 10 years and 6,240,000 bbl. during the following decade. To produce those volumes of crude oil it will be necessary to discover and develop 25.9 billion barrels and 25.0 billion barrels of reserves, respectively, as compared with 23.3 billion barrels of new oil found during the 10 years just ended.

"To date there have been discovered in the continental United States upwards of 58 billion barrels of crude oil on a total of 5.1 million acres. There are in the United States 900 million acres considered favorable to the production of oil. Of that total, only 20 per cent is under lease, either awaiting exploration or being explored.

"Searching efforts in the United States have reached an all-time peak and must be continued in order that this nation's growth in the use of petroleum may continue and until a backlog of reserves has been built up adequate to meet requirements in emergencies.

Reserve Outlook Good

"Today the oil industry is spending upwards of $675,000,000 a year in the search for new reserves. It is unlikely that these efforts will go unrewarded. In fact, during 1947 there were 4.3 billion barrels of new oil 'blocked out'."

The Continental Shelf, Knight said, must be considered in appraising future discoveries, but he declined to make any forecast of this until marine drilling has been further developed. He stressed, however, that secondary recovery and scientific development of all fields must be increased in order to take full advantage of present known reserves.

Synthetics Seen Remote

Progress made in the production of synthetic fuels in recent years has been noteworthy, Knight said, but he added:

"This field of research is in its infancy and should be greatly extended only after it is indicated that necessary volumes of products cannot be made available from crude oil with the expenditure of lesser amounts of capital and equipment. The United States has unlimited resources of basic materials in the stockpiles of oil shale and bituminous coal from which required products could be produced. But to embark upon an extensive program at this time would require steel and equipment which can be used more effectively in the expansion of crude oil operations."

OIL INDUSTRY OPERATIONS—HISTORICAL AND FORECAST

	1938-1947		1948-1957		1958-1967	
Demand:	Millions of barrels	1,000 B/D	Millions of barrels	1,000 B/D	Millions of barrels	1,000 B/D
Domestic	15,355	4,205	24,730	6,770	26,920	7,370
Exports	1,596	437	1,910	250	800	220
Total	16,951	4,642	25,640	7,020	27,720	7,590
Less:						
Production natural gasoline, etc.	867	237	1,950	535	2,160	590
Production motor benzol	24	7	20	5	10	3
Imports crude and products	895	245	2,230	610	2,760	757
Stock withdrawals	61	17	.....	.....	.....	.....
Total	1,847	506	4,200	1,150	4,930	1,350
Crude-oil production	15,104	4,136	21,440	5,870	22,790	6,240
Reserves:						
Beginning of period	15,507	.....	23,740	.....	28,200	.....
End of period	23,740	.....	28,200	.....	30,380	.....
Reserve increase	8,233	.....	4,460	.....	2,180	.....
Crude-oil discoveries	23,337	.....	25,900	.....	24,970	.....

International

WORLD-WIDE OIL DEVELOPMENTS

South America's Longest Pipe Line Moves Toward Southern Gas Fields

by Paul Reed

SOUTH America's longest pipe line, the 1,100-mile 10 and 10¾-in. line to bring natural gas from Comodoro Rivadavia fields, currently is stretching southward from Buenos Aires at a rate of nearly 2 miles a day.

Using pipe fabricated in Buenos Aires, a highly mechanized spread, organized and equipped by Direccion General del Gas del Estado, is pushing construction of the line from its northern terminus.

In the south, Compania Technica International has contracted to lay pipe manufactured in Italy from the southern gas fields toward a junction with the northern spread.

The project is not only the longest pipe line undertaken in South America, but also is the first extensive gas line on the continent. It is being constructed entirely by Argentine personnel.

It will follow closely the Comodoro Rivadavia-Buenos Aires highway, facilitating the handling of equipment and supplies.

To Tap Large Reserves

When completed, the line will have an initial daily capacity of 35,300,000 cu. ft. Reserves in the fields which the line will tap are estimated to be between 490 and 875 billion cubic feet.

The northern spread is using modern construction methods and is so equipped that it is largely self-sufficient while operating in remote localities.

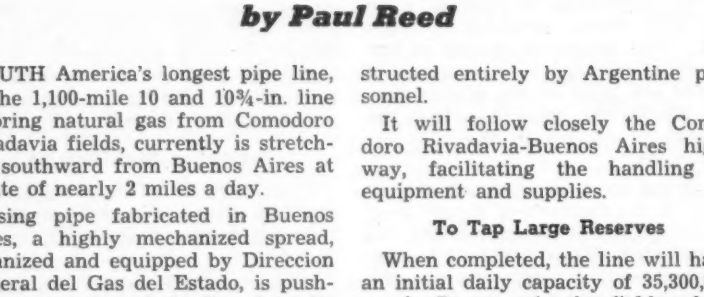
Unusual construction features include the double jointing of pipe on the right-of-way and the practice of lowering coated and wrapped pipe directly behind the dope machine.

Welding is accomplished by a combination of double jointing and stove piping. In double jointing, a boom tractor handles the pipe, which is roll-welded on dollies on the right-of-way. The two-joint sections are added to the line by eight "all-position" or "bell-hole" welders working in pairs. After each day's work, the completed section is tested with compressed air.

Eight 250-amp. welding units, each towed by a jeep, are used in work on the forward end of the line. Several 400-amp., truck-mounted units are available for utility operations.

After application of a primer coat, the pipe is coated with Asfasol K, wrapped with impregnated paper, and lowered directly into the ditch. Pipe is coated only in areas where corrosive conditions have been indicated by a survey of the resistivity characteristics of the soil.

Automotive equipment in use includes eight modern buses and ambulances, 20 van-type trailer units serving as offices, warehouses, and other facilities, and cars and trailer houses for supervisors. Pickups and various truck equipment are available for transporting fuel and lubricants and for stringing pipe.



Typical of the modern equipment being used in laying the Argentina gas line is this jeep-towed welding unit

Resumption of Work Planned in Ethiopia

Negotiations were under way this week between the Ethiopian Government and the British military administration to permit resumption of operations by Sinclair Oil Corp.

The operations were halted recently in Ogaden province as a result of sabotage. The British administration controls Ogaden province under a 1944 treaty.

Tapline Pipe Arrives

The first 40 miles of pipe for the projected 1,075-mile Trans-Arabian pipe line has arrived in Saudi Arabia from California.

Creole Pays Government 19 Cents Per Barrel, Keeps All Royalty Oil

UNDER terms of the recent negotiations between the Venezuelan Government and Creole Petroleum Corp., in which Creole agreed to pay an additional approximate 19 cents per barrel for its share of royalty crude oil, Creole is now buying all of its royalty oil except that which the government previously contracted to sell to outside sources.

This means, on the basis of Creole's daily December production of 616,838 bbl., that the deal involves approximately 83,000 bbl. The government previously arranged to sell about 17,000 bbl. of Creole's royalty crude, which is according to contract whereby the royalty oil can be taken in kind or in cash.

Indicative of the course of events, in which the government reserved to take certain percentages of royalty oil (Creole and other companies) for barter purposes, was the announcement in Caracas last week that Venezuela and Argentina have signed an agreement whereby Argentina will get 2,000,000 bbl. of crude oil in exchange for 15,000 tons of frozen meats this year.

A total of 1,000,000 bbl. of royalty oil will be delivered at El Caure, Anzoategui, Venezuela, and the other 1,000,000 bbl. at Guaraguao, in the same state, for transshipment to Buenos Aires. The agreement provides that deliveries may vary in volume up to 10 per cent, more or less. The door is left open "for increasing the amounts of produce to be sold under similar rules amounting to an enlargement of the agreement," according to the Venezuelan-Argentine trade compact.

No Premium Involved

In completing this deal, it was explained that the additional increases of approximately 19 cents per barrel are not considered premiums, but rather the acknowledgment of the going market price; i.e., what the Venezuelan Government could get by taking Creole's royalty oil in kind and selling it on the open market.

Mene Grande Oil Co., a Gulf Oil Corp. subsidiary, has made a similar deal with the government, and the Royal Dutch-Shell operating company in Venezuela is said to be completing similar negotiations. Cia. Consolidada de Petroleo (Sinclair) and Socony-Vacuum Oil Co. of Venezuela had no comment as of late last week.

The following table shows the new royalty oil prices which Creole is paying per barrel for various gravity crudes in Venezuela:

	°A.P.I. gravity	Dollars per barrel
Quiriquire	18.5	1.98066
Jusepin	32.5	2.26927
Mulata	33.5	2.27284
Temblador	21.5	2.03721
Oficina-OS	29.0	2.18353
Guara-GS	38.0	2.38955
Yopoles-YS	21.5	2.02905
Nipa-NS	39.0	2.38129
El Roble	53.0	2.70894
Tucupita	16.5	1.89615
Pedernales	21.5	2.02548
Lagunillas (Medium)	25.5	2.06509
La Rosa (Medium)	26.0	2.07740
Tia Juana 102	26.0	2.07740
Mara	30.0	2.15663
Cumarebo	48.5	2.64374
Lagunillas (Heavy)	17.5	1.90509
Tia Juana (Heavy)	17.5	1.90663
Bachaquero	15.5	1.86252
La Rosa (Playa 31) (Heavy)	15.9	1.87540

With the exception of Cumarebo, the last nine fields above lie in the Bolivar Coastal district.

Breakdown of German 1947 Imports Shown

Total 1947 German imports of crude oil, diesel oil, and gasoline amounted to 891,366 tons, or approximately 6,685,245 bbl., according to figures released to Reuters in Berlin.

Broken down, this showed that 39,407 tons, or 295,553 bbl., were Venezuelan crude oil; 500,000 tons, or 3,750,000 bbl., were diesel oil; and 351,959 tons, or 2,639,692 bbl., were gasoline.

Crude-oil imports began in the second half of 1947 when some refinery units went back on stream. Occupation sources state that there are nine refineries in Germany with a daily capacity of 24,000 bbl. Indigenous production there averaged 11,000 bbl. daily last year.

N.E.I. Output to Reach 75 Per Cent of Prewar Level

Petroleum production this year in the Netherlands East Indies will approximate 75 per cent of the prewar daily output of 157,000 bbl., according to Walter A. Foote, United States consul general at Batavia. Foote was in New York City last week.

Foote stated that the East Indies' potential was sufficient to double the prewar production rate. Last year, N.E.I.'s estimated daily production was 35,600 bbl. compared with 11,500 bbl. daily in 1946. The East Indies area, which Foote referred to, includes N.E.I., British Borneo, and New Guinea.

Creole Refinery Plans High Fuel-Oil Output

Design of the new 60,000-bbl. refinery of Creole Petroleum Corp. now under construction on the Paraguana Peninsula at Caracas, Venezuela, has been changed. The change will be from a plant originally planned to produce primarily gasoline to a plant concentrating on heavier oils. Most of the fuel oil will go to the United States.

In place of the 43,000 bbl. fluid catalytic cracking equipment originally planned, Creole will build a 7,000-bbl. hydroformer. This will cut the output of gasoline to one-third and boost diesel and bunker oils by more than two-thirds.

In 1944 the refinery construction cost was estimated at $50,000,000. In 1946 the estimation was increased to $65,000,000. The present estimate is placed at $120,000,000 despite change in design to reduce capital investment.

Projected yields of diesel oil and bunker fuel will be about 73 per cent of a barrel of crude, 58 per cent bunker oil and 15 per cent diesel. A yield of 20 per cent is planned for all grades of gasoline. Under the original plans gasoline yields would have totaled about 50 per cent, bunker oil 35 per cent and diesel fuel 12 per cent.

Russians Moving Three Hydrogenation Plants

Reports from the Russian zone of Germany indicate that three of the largest German hydrogenation plants have been dismantled and are being shipped to Siberia for assembly at a site on Lake Baikal.

These are the plants at Poelitz, near Stettin; Blechhammer, in Upper Silesia; and Magdeburg, on the Elbe River. The three plants had a total rated capacity of approximately 26,000 per day of synthetic fuels, though air attacks kept their actual output below this figure. Poelitz was the largest German plant, and its peak production was about 15,000 bbl. per day in April 1944. Magdeburg produced about 4,000 bbl. per day that month. The Blechhammer plant was the most modern in Germany but was just getting into production when the Russians occupied Silesia. It produced about 2,500 bbl. per day in November 1944.

Netherlands Takes Oil Spotlight in Review Of European, Far East Activities

by Warren W. Burns

EUROPEAN and Far Eastern oil-production activities last year were, for the most part, relatively insignificant when compared with crude-oil production rates of Latin America and the Middle East.

The only development of note in Europe was in the Netherlands, where production from wartime-discovered Schoonebeek field rose from a daily average of 1,195 bbl. in 1946 to 4,000 bbl. in 1947. In the Far East, the crude output of the Netherlands East Indies was held down to approximately 31,000 bbl. daily—due to unsettled political conditions—compared with a prewar production of 157,000 bbl. daily.

In a review of 1947 foreign production at the recent New York meeting of the American Institute of Mining and Metallurgical Engineers, Ray P. Walters, production executive of Standard Oil Co. (N.J.), pointed out that European production continued to decline, dropping to 130,900 bbl. daily, compared with the 1946 average of about 137,000 bbl. and the 1945 wartime peak of 178,000 bbl. daily.

Of Europe's 130,900 bbl. daily production last year, 114,000 bbl. was from Eastern Europe and 17,000 bbl. daily from Western Europe.

Netherlands Output 4,000 Bbl.

In a paper on the Netherlands, A. A. G. Schieferdecker, an engineer for Bataffsche Petroleum Mij. (Royal Dutch-Shell), pointed out that while production averaged 4,000 bbl. daily, the actual potential at the end of 1947 was 7,000 bbl. daily, from 38 wells.

Schoonebeek (or Coevorden) field, in the Netherlands, is located just across the border from Emlichheim field in Germany, where eight wells were brought in during the war. Geophysical surveys at Emlichheim, during the war, indicated a promising structure, and while the Germans brought in eight wells, the Dutch completed only two. Schieferdecker observed that this was indicative of the fact that the Dutch had no desire to support the Nazi war effort.

The Schoonebeek structure is an anticline of the "bald headed" type. The present producing area is situated in the eastern plunge with a small spur running south across the frontier, thus constituting Emlichheim field. The oil sand of about 100 ft. thickness belongs to the Lower Cretaceous Valaginian formation and is encountered at a depth of 2,500 to 2,650 ft. Numerous faults intersect the field. The known pool covers an area of 2,500 acres. The field is being drilled up in a 40-acre spacing grid.

Modern Rigs in Use

Since the end of hostilities, several modern rotary rigs have replaced the clumsy installations left behind by the Germans. The oil is of 24.8° A.P.I. gravity and is very viscous owing to a high paraffin content. Its pourpoint is 23° C. Due to a low gas-oil ratio, the flowing life of the wells is short. All wells are equipped with electrically driven pumping units with 2½-in. or 3-in. pumps. In block stations the oil from 10 to 16 wells is collected and piped to a terminal at a railhead a short distance from the field. Regular oil trains transport the crude to Rotterdam where Shell has a 14,000-bbl. refinery. By 1950 Caltex Petroleum Mij. (Netherlands) N.V., hopes to complete a 20,000-bbl. refinery also at Rotterdam. The Caltex refinery probably will run largely on Middle East crude oil.

Owing to the viscous nature of the Schoonebeek crude oil, Schieferdecker said, special measures have to be taken, especially during winter, to keep the temperature of the crude above the congealing point. For this purpose all gathering lines and trunk lines are provided with inner heating tubes. Furthermore, all tanks are insulated and provided with heating coils. In order to cope with the paraffin trouble in the wells, hot oil has to be circulated at short time intervals.

The search for oil is being continued in the Netherlands. There are at present two gravity-meter and two seismic parties in the field. Deep exploratory drilling is proceeding, with two rigs currently drilling west of Coevorden and at Delft, near the west coast of Holland.

Last September a new company was formed, Nederlandsche Aardolie Mij., which will handle production activities there. It is equally owned by B.P.M. and Standard Oil Co. (N. J.), with B.P.M. as the operator.

German Output Down

The only other significant production in Western Europe is in Germany, where the 1947 estimated output averaged 11,000 bbl. daily. This is a decline from wartime high of 19,754 bbl. daily in 1940. Discoveries along the German - Netherlands border, namely at Emlichheim, have not contributed greatly to German production to date, but they have extended appreciably the potential producing area.

In a recent article on European oil production in "The Lamp," a publication of Jersey Standard, it was pointed out that 90 per cent of Germany's production—which means about 57 per cent of all the crude

CRUDE-OIL PRODUCTION IN EUROPE (FIGURES IN BARRELS DAILY)

	1940	1941	1942	1943	1944	1945	1946	1947
Albania	4,000	3,507	4,775	3,000	.....	1,000	1,000	1,000
Austria	8,057	12,222	17,000	21,610	23,707	8,886	16,566	18,400
Czechoslovakia	500	525	575	600	550	500	525	500
France	1,037	1,350	1,350	1,500	1,400	1,400	1,075	1,000
Germany	19,754	17,214	14,523	13,973	13,607	10,402	12,382	11,000
Great Britain	358	632	1,656	2,298	1,912	1,452	1,129	1,000
Hungary	5,339	8,944	14,020	17,605	16,951	13,751	14,097	12,300
Italy	224	225	225	150	110	100	200	200
Netherlands	.....	.....	.....	4	33	112	1,195	4,000
Poland (Western)	3,600	3,900	4,300	5,900	4,000	3,500	2,614	2,500
Rumania	116,789	109,749	116,600	109,530	71,939	94,528	86,200	78,000
Yugoslavia	.....	.....	1,000	1,500	2,000	1,000	1,000	1,000
Total Europe, excl. Russia	159,658	158,268	176,024	177,670	136,209	136,631	137,983	130,900

oil produced in western Europe—comes from small well-defined fields in the salt-dome areas around Hanover and elsewhere in northern Germany.

"These formations are so complex and irregular, so broken by faulting," the article states, "that the oil has been sealed into relatively small traps on the sloping flanks of the salt domes. Neither the typical field nor its production is ever large; and because it has no great reserve on which to draw, sooner or later its production declines."

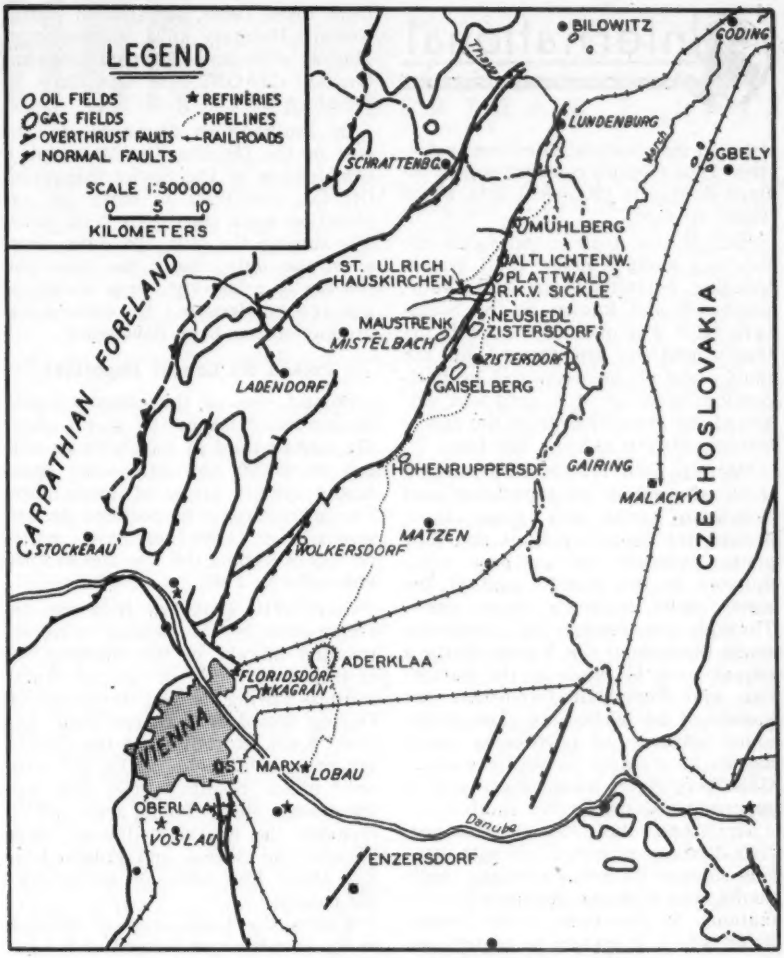
No major oil field has ever been discovered in Western Europe, and on the basis of current geological knowledge, the experts hold out little hope. However, the small indigenous production in countries in this area is important as a boost to the war-torn domestic economy.

As for the other countries in Western Europe—France, Italy, and Great Britain—a small production of approximately only 2,000 bbl. daily was shown for 1947. And there have been no significant developments in these countries since the end of the war.

Rumanian Rate Declining

In Eastern Europe, which produced approximately 114,000 bbl. daily in 1947, Rumania continues to be the dominant factor. However, Jersey Standard's Walters explained, the producing rate there is on the decline. During 1947 the production was only 78,000 bbl. daily, or a decrease of 55 per cent from the all-time peak of 175,000 bbl.

Most of Rumania's production is from the Ploesti district. There have been no important discoveries since Bucsani field in 1933. Of Rumania's total production, it is estimated that during 1947 as much as 46 per cent in crude and products was exported to Russia. Exports to other countries were of relatively minor importance. *(For more information on Russia's dominant role in Rumanian and Hungarian oil operations, see The Oil and Gas Journal's A.I.M.E. report, April 5, 1947, page 44. This situation has not changed.)*



Map of Austria showing location of oil and gas fields

Austria Is Second

The second most important crude-oil-producing country in Eastern Europe is Austria, which during 1947 produced approximately 18,400 bbl. daily. Austria was of only minor importance before the war and hit a wartime peak of 23,707 bbl. daily in 1944. In 1938, the daily production was only 1,100 bbl. Both the 1946 daily production of 16,566 bbl. and the 1947 figure are estimates in that the Russians refused to confirm the production they control.

With the exception of an intensive core-drilling campaign in the Burgenland district of southeastern Austria, begun by the Soviet Minderal Oil Administration (SMOA) in 1946, no oil-field exploration worthy of the name has been undertaken in Austria for the past 4 years, according to Brandon H. Grove, European geologist for Socony-Vacuum Oil Co., Inc.

Grove wrote the A.I.M.E. paper on Austria and explained that a single wildcat, being drilled by SMOA on the Matzen structure in the Vienna Basin, is currently shut down owing to a nearly hopeless fishing job.

Russia's virtual control of Austria's oil production precludes collection of

AUSTRIAN PRODUCTION BY FIELDS

Field—	Date of discovery	Production 1946 Oil, metric tons*	1946 Gas, cubic meters†	1947 Oil, metric tons*	1947 Gas, cubic meters†
St. Ulrich-Hauskirchen	1938	373,234	22,800,000	379,500	20,000,000
Neusiedl	1936	.....	.....	.....	.....
Maustrenk	1941	38,750	.....	23,500	.....
Scharfeneck	1944	1,369	.....	.....	.....
Muhlberg	1942	110,511	15,600,000	215,000	21,000,000
Alt-Lichtenwarth	1940	.....	5,000,000	.....	4,000,000
R. K. van Sickle	1939	42,126	.....	37,500	.....
Gosting	1932	102,790	284,930	108,500	363,890
Rag	1930	32,383	1,466,190	32,000	488,640
Gaiselberg	1938	143,411	5,299,970	138,000	2,550,700
Hohenruppersdorf	1941	440	.....	5,000	3,000,000
Aderklaa	1942	682	18,305,400	1,000	30,500,000
Oberlaa	1932	.....	.....	.....	.....
St. Marx	1944	.....	142,000	.....	.....
Leoprechting	1906	.....	.....	100	.....
Wels	1891 (1944)	.....	27,980	.....	.....
Total	....	845,696	68,926,470	940,100	81,903,230

*A metric ton is equal to about 7.5 bbl. †A cubic meter is equal to about 35 cu. ft.

detailed information on current activities. Thus Grove's remarks were confined largely to geological data, about which he said:

"All of the Austrian oil fields are localized along a major fault system trending north-northeast and south-southwest and known as the Steinberg fault. For most of the fields the trap conditions are formed by the fault plane on the west and by half-doming, possibly of a drag-fold origin, of the Miocene beds on the downthrown eastern side of the fault.

"Within such faulted structures, a thick alternation of Sarmatian and Tortonian sands and clays abuts against the Steinberg fault and dips gently eastward. Oil has been accumulated in the highest part of the sands under a strong water drive. Through correlations of producing sands throughout the Vienna Basin a sequence of 44 sands in the Sarmatian and Tortonian formations are known to be oil-bearing. The maximum sequence of oil-bearing sands known in a single locality occurs in Gaiselberg field, where there are 14 superimposed productive sands."

The Vienna Basin, Grove explained, "is a Tertiary graben filled with Miocene marine to brackish-water sediments, and Pliocene fresh-water formations. In that part of the Vienna Basin which is known to contain oil, the basement and marginal rocks are formed by a characteristic facies of clastic Alpine foredeep sediments consisting of cyclic alternations of sands and shales, variably calcereous, which are comprehensively designated by the term 'Flysch'."

Although commercial quantities of oil have been found to date only in the Vienna Basin, other areas of Austria appear to offer the necessary conditions for the origin and accumulation of oil, Grove explained. Conspicuous among these are the foothills of the Alps in the Mollasse trough of Upper Austria, the Miocene basin of Gratz, and folds in the Mio-Pliocene in Burgenland. The latter are extensions of the Gratz basin and the Hungarian basin in southeastern Austria. However, of 40 exploratory wells drilled since 1935 in areas outside the Vienna Basin in Austria, none has given significant positive results.

Hungarian Output Small

Hungary, like Austria, was of relatively minor importance preceding the war. Production was built up to a maximum of 17,605 bbl. daily in 1943, but declined to 14,097 bbl. daily in 1946 and to 12,300 bbl. daily in 1947. With the exception of some very minor areas, all production is obtained from three fields, situated in southwestern Hungary on a concession of Magyar Amerikai Olajipari Reszventarsaag (MAORT), a subsidiary of Standard Oil Co. (N. J.).

In southeastern Hungary, to the east of the Danube, the Maszovol, a combination of the Soviet-Hungarian Oil Co., continues to carry on exploration work started by Nazi interests during the war. To date, however, the only result has been the finding of relatively minor shows of gas and condensate. No commercial production has been developed.

Poland No Longer Important

Poland, one of the oldest oil-producing countries in the world—having ranked third in 1909 with an output of 42,000 bbl. daily—has practically ceased to be of importance. The producing rate declined to approximately 11,000 bbl. daily immediately preceding the war and to 2,500 bbl. daily in 1947.

Since 1910, Boryslaw field has declined steadily, the decline being attributed largely to the flooding resulting from lack of proper water shutoffs during its past development. During World War II, the Nazis exerted great efforts toward the discovery of new oil fields in Poland with only minor results. After the war the eastern oil-producing areas, which included the Boryslaw district, were annexed by Russia, and Poland thus lost about four-fifths of its producing capacity.

Within the boundaries of Poland, as the country was defined at the beginning of this year, there are 38 small oil fields with about 2,400 producing wells yielding a daily average of approximately 1 bbl. per well. There are also in present-day Poland five producing gas fields. These together yield a daily production of around 500,000 cu. m. As of the first of 1948, there were 70 wells drilling in Poland, of which 25 could be classified as wildcats.

Development drilling within proven areas of presently known fields has been almost entirely completed. As a result, methods of secondary recovery, chiefly repressuring, are being increasingly applied with generally very good results.

Poland's proved oil reserves currently are estimated at about 2,000,000 tons, or 15,000,000 bbl., but this figure is dependent on the level taken as the lower economic limit of production.

During the last war the Polish crude-oil industry suffered relatively little direct damage. However, indirect damages due to the war were, and are, considerable and result from the excessive wear and tear on Poland's already antiquated equipment. The current energetic efforts of the industry to rehabilitate itself are handicapped primarily by lack of replacement parts for obsolete and worn-out plants.

The Polish oil fields all occur in the "Flysch" beds, which are Cretaceous to Oligocene in age and which trend in a long arc paralleling the Alpine and Carpathian foreland from Austria through eastern Czechoslovakia and southern Poland into Rumania. Within this zone the "Flysch" beds, consisting of cyclic alternations of sandstones and shales, are strongly deformed and frequently overturned and overthrust. These structures, without exception, form the traps responsible for the Polish oil fields.

Gas Field Found

Following its creation by Communists in Poland in 1945, the nationalized oil industry began a relatively active exploratory campaign with the aim of bringing indigenous production up to the needs of domestic requirements. To date this has resulted in the discovery of a gas field in the western Carpathians near the Czech border at Cieszyn.

Good prospects for the discovery of additional gas fields also were discovered in the Tertiary Basin of the Carpathian foreland, and exploratory activities at present are concentrated on the further blocking out of these gas prospects. One wildcat well recently also encountered a considerable gas accumulation deep in the Jurassic basement rocks of the Tertiary Basin.

Aside from the historical oil-producing areas of Poland, the conditions for oil discovery theoretically exist also in the northwestern part of the country, which contains a prolongation of the north German Cretaceous-Tertiary Basin. Within this area drilling also has begun in the vicinity of Innowroclaw. However, this is on a small-scale basis at present.

In Eastern Europe, it is believed that an additional 2,500 bbl. daily comes from Czechoslovakia, Yugoslavia and Albania, but no developments of note have been reported from any of these countries.

Far East Picking Up

While the Far Eastern oil picture was not bright last year, insofar as any notable crude-oil production was concerned, the over-all exploratory and drilling activity gained in momentum.

The political situation in some areas of the Netherlands East Indies continued to prevent the companies from rehabilitation work. However, by the end of 1948, it is expected that N.E.I. and British Borneo production will be up to about 112,000 bbl. daily compared with the prewar output of around 157,000 bbl. daily.

Production from N.E.I.'s south Su-

(Continued on page 129)

WASHINGTON WATCHING

BY BERTRAM F. LINZ

German Lesson

WASHINGTON. — Defense Department officials' reluctance to commit themselves to a program to stockpile oil against a future war is based in part on Germany's experience in that field and offers a clue to why Secretary James V. Forrestal has so vigorously supported the plan to establish a synthetic-fuels industry in this country.

Intelligence missions in Germany found that the Nazis originally planned to build up big stockpiles of aviation gasoline and diesel fuel before they engaged in a shooting war, but events moved too fast and they actually became involved in war with only about half of the reserve they had aimed at.

Military planning for a possible war is based on a supply of at least 2,000,000 bbl. daily of oil for a period of 5 years. It is estimated it would take a quarter to a half-million barrels a day for 5 years to build a stockpile which, with constant additions at the same rate, would make this supply anywhere near possible.

Admittedly, it would take an even longer period to build up a corresponding large production of synthetic fuels, but there are signs the military may believe that if some plants are built in the near future and production processes perfected it may be possible more quickly to build up the industry.

All of the discussions of these proposals have been in terms of years and military spokesmen have said nothing to indicate they are concerned with the immediate future, but there is nothing to indicate that war won't come for another 10 to 20 years, and many possibilities it may come sooner are inherent in the present disturbances in the Middle East and continued communist pressure in Europe, the latter always westward.

A definite program to achieve oil security will be worked out in the department in the next few months and may be submitted to Congress before it adjourns next summer. It is quite possible that program may call for even broader synthetic production than proposed by Interior Secretary Krug, plus an immediate start on a stockpile of imported oil.

Efficiency Expert

AN important streamlining of the executive branch of the Government may grow out of the studies now being made by a commission headed by former President Herbert Hoover.

Hoover, who got some first-hand information some years back on how well the various departments can work at cross purposes, has enlisted some of the best brains in the country to dig into the federal Government and see where the machinery needs repairing.

The Commission on the Organization of the Executive Branch of the Government, which eventually probably will be known by the Polish-like title of COEBG, is a bipartisan body of which former Undersecretary of State Dean Atcheson, Civil Service Commissioner Arthur S. Flemming, Defense Secretary James V. Forrestal, industrialist George H. Mead, Sen. George D. Aiken of Vermont, former Ambassador Joseph P. Kennedy, Sen. John L. McClellan of Arkansas, Dr. James H. Pollock of the University of Michigan, Congressmen Clarence Brown of Ohio and Carter Manasco of Alabama, and former Presidential Administrative Assistant James Rowe, Jr., are members.

One of the projects Hoover recently has started is a study into the executive management of natural resources which may turn up some new ideas on the handling of the oil resources of the public lands. The inquiry is being made by a committee headed by ex-Gov. Leslie Miller of Wyoming, to which he also has appointed Donald H. McLaughlin, formerly dean of the College of Engineering at the University of California, and John J. Dempsey, former governor of New Mexico and one-time undersecretary of the Interior.

Steel Report

THE NPC committee on steel requirements headed by Russell B. Brown, general counsel of the I.P.A.A., is expected to come up within the next few days with definite figures of the metal required by the oil industry for its operations at home and abroad.

The figures will be turned over to the Oil and Gas Division and, without waiting for the council's next session, will go immediately to the Department of Commerce for consideration in connection with the voluntary agreement which is being worked up by the steel industry under the Taft Antiinflation Act.

A number of subcommittees have been actively at work during the past few weeks, each gathering data on the needs of some specific branch of the industry, and before they are compiled in final form will be subjected to a thorough going-over to squeeze out whatever water there may be in company estimates.

Undoubtedly in preparing their estimates, some operators will be overoptimistic regarding their future undertakings and some may figure that the Commerce Department or the steel industry is sure to shave down any estimates submitted and if the figures are jacked up to begin with they may stand a chance of getting what they actually need.

Members of the committee, however, are anxious to develop statistics that represent the actual needs of the industry and are planning to put all estimates through a tight wringer.

They report that all branches of the industry are responding promptly and adequately to their requests for information. Brown's opposition to the export of steel for big foreign operations apparently is being ignored by companies with activities abroad, whose figures are coming in along with those of others, possibly a recognition that this is one thing on which the industry must stick together if it is going to get the materials needed to meet its responsibilities.

Bureaucrat's Thorn

THE two revisions in first-quarter oil-export quotas by the Office of International Trade show that bureaucrats, like stones, can be dislodged from their position provided you have a long enough lever and plenty of tenacity.

Congressman John Walter Heselton of the First Massachusetts District had both, and to him must go much of the credit for the cut-backs. As a member of the House interstate commerce committee, he hammered hard at Commerce Department officials who appeared in defense of their export program; he sent them long and frequent telegrams demanding the suspension of exports, and he told the House, day after day, just what the OIT was and was not doing.

Heselton wasn't above needling the industry, either, and he gave it something of a shock last month when he introduced legislation to create a national petroleum commission whose jurisdiction, he intimated, would be as broad as the Atlantic Ocean.

Now serving his second term in Congress, Heselton is one of the "young men"—48 years old in St.

Patrick's day, which under the guise of Evacuation Day is celebrated in Boston, across the river from Harard Law School, where he got his degree. He got in the Army in October, 1918, a month before the end of the war, and was out again in December. His springboard to Congress was two terms as district attorney in his home district.

Although Heselton managed to make the OIT shave its quotas, he hasn't been able to put over his idea of a total suspension of exports. The nearest he came to that was when issuance of licenses was held up for 2 days while the department got new reports from abroad on the actual needs of foreign countries which resulted in the second reduction of allocations.

Cart Before Horse

FEDERAL Power Commission officials told Congress last summer that it should hold up action on revision of the Natural Gas Act until their natural gas investigation report was submitted, which they said would be only a matter of weeks, but today nobody is willing to hazard a guess as to when that report will go to the Capitol.

When last year's promise was made there were five members on the commission. Today there are only four members, the post then held by Commissioner Richard Sachse being vacant, and those four are evenly divided and unable to agree on the several staff reports which have been prepared by Burton N. Behling, director of the investigation, who has been nominated by President Truman to be the fifth member of the commission but has not yet been confirmed by the Senate.

Eight of these staff reports have been published, and in the last three it has been noted that Commissioners Nelson Lee Smith and Harrington Wimberly "subscribed" to Behling's findings, which in general affirmed the contentions of the industry that the act needed revision. But Commissioners Leland Olds and Claude L. Draper are adamant in their opposition to what they call "tampering" with the law, and have issued a lengthy report of their own reviewing the evidence presented during the investigation and giving their own interpretations.

So long as the fifth post on the commission is unfilled, there is no chance whatever of any agreement being reached. Republican congressional leaders, foreseeing a change in the administration next January, are not inclined to confirm the President's nominations for policy-making posts and may or may not act on Behling this session. If he is confirmed, however, he will, of course, make the Smith-Wimberly twosome a majority.

Having provided the funds for the investigation, Congress will want to have a report on its results—a report by the commissioners and not from the staff, which has no authority to make formal recommendations on legislation. So, eventually, a commission report may be expected, but it is likely the legislation for revision of the Natural Gas Act will long have been disposed of by the time members of Congress get it.

Texas, Gulf States, Face Tidelands Suits

WASHINGTON. — The Department of Justice is preparing to file a suit against the state of Texas to get possession of the oil rights off the Gulf Coast, Attorney General Tom Clark revealed March 2.

A similar suit will be filed against Louisiana and possibly other Gulf states. The actions will be similar to the suit against California in which the Supreme Court last June declared that the federal Government has paramount rights over tidelands.

Clark revealed this intention during the course of testimony before a joint Senate-House judiciary committee hearing in which he strongly opposed legislation, supported by officials of most oil and coastal states, designed to give control of tidelands and all submerged lands to the states. He characterized the bill as a "gift, without any consideration whatsoever, of valuable rights belonging to the United States."

The first Government witness to appear, following several days of testimony by many state officials, Clark defended the Supreme Court decision, declaring that the only legislation necessary in the situation is a measure providing a management policy "for this property and all other which is similarly situated and held to be the property of the United States."

"Now that the Supreme Court has decided that the rights in the submerged lands in the marginal sea belongs to the United States," he said, "every consideration of public policy calls for their dedication to the interests of all the people of the United States. It is unthinkable that the Congress of the United States will give away, without any consideration, without any real knowledge of the size of the gift, valuable rights in oil and perhaps other essential minerals necessary to the defense of the nation and to the welfare of all the people of the country."

New Limitations on Exports Announced

WASHINGTON.—Exports of crude oil to foreign countries other than Canada, put under license control last month, will be limited to a total of 800,000 bbl. for the period between February 17 and March 31, it was announced March 1 by the Department of Commerce.

This amount for the 6-week period will be slightly under the average exports of 600,000 bbl. monthly in recent months.

No limitations have been imposed on exports to Canada, whose purchases have been running around 2,600,000 bbl. monthly.

Only the over-all quota for the remainder of the first quarter has been fixed so far, and country allocations have not yet been decided.

House Group Approves Limited Exports Ban

WASHINGTON. — A 30-day embargo on exports from any East Coast or Gulf Coast port of kerosine, gas oil, or distillate, or residual fuel oil was approved by the House interstate commerce committee March 2.

The committee voted to report a joint resolution introduced by Rep. W. Heselton of Massachusetts after limiting its scope to the products and ports specified. Heselton had sought to ban all exports of crude and all products.

Bethlehem Plans Three 28,000-Ton Tankers

Three 28,000-ton oil tankers are included in the Bethlehem Steel Co. shipbuilding program in Baltimore, Md. According to A. B. Homer, president, two of the ships would be for an American company and the third for foreign interests. He said that two more ships in the same class may be authorized.

Other shipbuilding plans include four 18,000-ton deadweight tankers for foreign interests.

Sunray Oil Corp. Acquires Lease on 6,500 Acres

A single 6,500-acre drilling block north of the recent Benedum field discovery well in Upton County, Texas, has been acquired by Sunray Oil Corp.

Sunray plans to approach its drilling program in the large block through geophysical exploration in order to establish subsurface data to guide future drilling activity.

Amerada Petroleum Corp., Phillips Petroleum Co., Sun Oil Co., and Stanolind Oil & Gas Co. maintain acreage in Upton and Reagan counties contiguous to the Sunray block.

Houston Office Opened

A branch office of the Fred Eldean Organization, oil-industry public-relations counsel, was opened March 1 in Houston. Roy L. Wade, formerly of the Eldean staff in Dallas, is in charge of the new office located in the Chronicle Building.

Oil Industry Better Represented Than Most in Foreign Service

WASHINGTON. — A more or less general illusion on the part of the public that the officials who protect the interests of American industry and business abroad are spat-wearing, cane-toting "diplomats" was shattered this week by a State Department survey which showed that few of them wear ankle-warmers, fewer still are graceful cane-twirlers, and 71 per cent of them had industrial or professional experience before joining the foreign service.

To even greater than average extent, a department personnel survey showed, men trained in the oil industry are representing the United States at key foreign posts as consuls, vice consuls, economic analysts, and petroleum and mining attaches, and their work is playing an important part in the over-all world petroleum picture.

The number of petroleum attaches recently was increased from three to five, all of them men who started their careers in the oil industry.

Ivan G. Harmon of Evanston, Ill., recently assigned to Rio de Janeiro after a period of duty in Washington, was connected for two decades with Marland Oil Co., of Ponca City, Okla., in almost every capacity from construction engineer and geologist to vice president. He was an independent operator and consultant from 1936 to 1941, when he joined PAW as head of its project section, leaving in 1945 prior to joining the State Department.

Experience Varied

Albert Lager, of Summit, N. J., now at Bogota, was with Siosi Oil Corp., Terre Haute, Ind., where he was engaged in almost every line of petroleum work from exploration, development, and well drilling to the general management and expansion of the company.

George Levangie, of Dedham, Mass., assigned to Lima, Peru, was with Standard Oil of Argentina for 22 years, where he got a good background for his present work as a geological engineer and field operator in charge of drilling, production, transportation, construction, administration, and local contact work. During the war he was with petroleum division of the bureau of supplies of the Federal Economic Admnistration.

Richard Funkhouser of Trenton, N. J., third secretary and vice counsul at Cairo, where he executes the duties of petroleum attache, was employed as a geologist by Shell Union Co. in 1939-40, working on analyses of West Kentucky wells, and in 1940 went to Venezuela for Standard Oil Co. He served overseas as a lieutenant in the Army from 1943 to 1945, when he joined the foreign service.

Olaf F. Sundt, Houston, recently transferred to Paris, started in the oil industry as a subsurface geologist for Humble Oil & Refining Co. From 1924 to 1926 he was European representative in London for McEvoy Co., oil-well equipment manufacturers, and did field work in Rumania before returning to this country in 1927 as geophysicist for Gulf Oil Corp. and in 1941 established himself as a consulting geologist and geophysicist in Houston, acting as chief geologist for Texas Gulf Products Co. until he was appointed to the foreign service in 1944.

A number of other foreign service officers also have an industry background, including Scott C. Lyon, Columbus, Ohio, recently recalled from Mexico City to study Russian at Columbia University, who was a chemical engineer at the Bayway refinery, Linden, N. J., from 1934 to 1936, and Robert S. Henderson of Pittsburgh, vice consul at Naples, who from 1938 to 1941 was an economic analyst in New York working on the preparation of statistical economic programs for world-wide operations and forecasting demand for Standard Oil Co. (N.J.)

Howard R. Brandon, vice consul at Algiers, owned a wholesale and retail petroleum business at Athens, Ga., before entering the service; Rudolph Cahn, vice consul at Rio de Janeiro, worked for The Texas Co. in that city from 1917 to 1920, and Marshall M. Vance of Middletown, Ohio, consul in Berlin, was a salesman and office statistician for Standard Oil Co. in Java from 1914 to 1917.

Oil Outsider Named To Consulting Post

WASHINGTON.—Clifford A. Hahn, industrial executive and engineer whose background shows no direct connection with the oil industry, was named last week as consultant on petroleum, gas, and oil equipment to John C. Virden, director of the Commerce Department's Office of Industry Cooperation.

Virden, who heads the department's administration of the proposed steel and other industry voluntary agreements under the Taft antiinflation legislation, announced also the appointment of A. K. Tigrett, Memphis investment banker and industrialist, as consultant on transportation equipment.

Hahn, who until recently was with the Holtzer-Cabot Division of First Industrial Corp. of Boston, has served in various supervisory engineering capacities with American International Corp., Stone & Webster, Heywood-Wakefield Co., and H. J. Heinz Co., and during the war served in an advisory capacity with the Bureau of the Budget and the War Production Board.

Synthetic-Rubber Bill Faces House Amendment

WASHINGTON.—The House armed services committee last week backed away from legislation it had previously approved to keep the Government permanently in the synthetic-rubber industry.

Noting the stiff opposition of the rubber industry, expressed before a Senate committee to which spokesmen for the industry gave approval of a bill calling for early disposal of the Government plants to private industry, the House group decided to support an amendment to the Shafer bill to terminate it June 30, 1950.

The Shafer bill, written after lengthy hearings, barred the sale of any Government plant except by a vote of Congress and approval of the National Security Resources Board. The measure had been given the approval of House Republican leaders and the administration.

It was explained the plan to put a 1950 termination on the legislation was designed to insure enactment without other major changes.

Industry Problems to Be Studied by NPC April 15

WASHINGTON.—The next meeting of the National Petroleum Council will be held April 15, it was announced February 27 by NPC Chairman Walter S. Hallanan.

The most important matters now scheduled to come up at the meeting include a review of the results of the industry's temporary voluntary agreement and the steel requirements as they will be provided for under the steel industry's agreement, a report on the liquefied petroleum gas situation, and a discussion of the gasoline situation this summer.

Storage Depot Planned

PORT BURWELL, Ont.—Graham Oil Co., of St. Thomas, Ont., is negotiating for lease of a 5-acre harbor site here, and is planning to erect a 5,000,000-gal. gasoline and oil-storage depot. Construction is to start this spring.

Domestic Crude Output Passes 5,400,000 Bbl. to Set New Record

UNITED STATES crude-oil production last week set a new all-time high for the fourth consecutive week with a daily average output of 5,425,625 bbl.

The figure was 47,305 bbl. daily above the previous record set during the week ended February 21. It was by far the largest increase in recent months.

Kansas reported the greatest gain, with production in that state climbing 37,350 bbl. daily to 299,000 bbl.

Other states showing gains of more than 1,000 bbl. were Mississippi, 3,850; Wyoming, 1,880; and California, 3,300. Oklahoma, with a decline of 1,050 bbl. daily, was the only state showing a drop in its daily average of more than 1,000 bbl. Texas, New Mexico, and Nebraska remained unchanged.

The new production record was the eighth new all-time high out of the first 9 weeks of 1948. Only in the week ended January 31 did production fail to show a gain over the previous week. The new output record also marked the first time in history that domestic production had exceeded 5,400,000 bbl. daily.

A comparison of domestic crude-oil production, by weeks, so far this year is shown in the following table.

1948 DAILY AVERAGE CRUDE-OIL PRODUCTION (BBL.)

Week ended—	
January 3	5,302,360
January 10	5,329,145
January 17	5,341,135
January 24	5,350,505
January 31	5,343,200
February 7	5,369,105
February 14	5,375,945
February 21	5,379,320
February 28	5,426,625

Bill Creating Oil-Regulatory Board Passed by Mississippi Representatives

THE Mississippi House of Representatives last week passed and sent to the Senate a bill creating a state oil and gas regulatory board.

Under the bill the board would consist of three members appointed by the governor, plus the lieutenant governor and the attorney general, who would act as exofficio members.

The three appointed members would be paid only on a per diem basis but would have authority to employ a full-time supervisor.

Opponents of the bill in the house succeeded in forcing adoption of a "compromise" amendment limiting the board's authority to regulate well spacing.

The amendment provides that the board shall never require a larger drilling unit than 10 acres for oil wells of less than 6,000 ft. in depth; of 20 acres for wells between 6,000 and 8,000 ft.; or of 40 acres for wells of more than 8,000 ft.

It provides further that drilling units for gas wells shall not exceed 160 acres for wells under 8,000 ft. or 320 acres for wells of more than 8,000 ft.

The bill contains a provision setting forth the state's oil and gas policy, as requested in the inaugural address of Gov. Fielding L. Wright. That policy, it says, is to "permit each and every oil and gas pool in Mississippi to be produced up to its maximum efficient rate of production, subject to the prohibition of waste." It declares also that it "is not the intent nor purpose of this law to require or permit the proration or distribution of production of oil and gas among the fields and pools of Mississippi on the basis of market demand."

North Texas Producers Meet in Wichita Falls

A series of papers on secondary recovery is one of the principal features of the annual convention of the North Texas Oil and Gas Association in Wichita Falls March 6. This program will run concurrently with the general session at the one-day meeting.

Reports to be given on the secondary-recovery program include: "Survey of Water Flood Operations in North Texas," P. K. Guthrie, Bureau of Mines Substation, Wichita Falls; "The Significance of Connate Water, Capillary Pressure, and Relative Permeability in Secondary Recovery," Dr. George H. Fancher, department of petroleum engineering, University of Texas; "Legal Aspects of Voluntary Unitization and Cooperation Agreements," R. M. Wagstaff, Abilene attorney; "Secondary Recovery Research in Texas," W. J. Murray, Jr., Texas Railroad Commission, Austin; "Economic Aspects of Water Flood Projects in North Texas," Walter C. Krog, petroleum engineer with Wayne H. Hammon, Wichita Falls; and "Gas Repressuring in North Texas," Roland Gouldy and Gordon R. Stine, petroleum engineers, Wichita Falls.

Included in the general session are: "Forecasting the Costs of Drilling," W. K. Powell, Two States Drilling Co., Dallas; and "Relationship of the Drilling Contractor to the Petroleum Industry—the Tubular Goods Situation," J. Ed Warren, past president, American Association of Oilwell Drilling Contractors.

At the Woman's Forum and annual banquet B. Brewster Jennings, president, Socony-Vacuum Oil Co., Inc., New York, will be the chief speaker. New officers of the association will be installed at the banquet.

Canadian Oil Production Shows 1947 Increase

OTTAWA.—Oil production from all Canadian fields in 1947 totaled 7,729,483 bbl., an increase of 122,584 bbl. over 1946, according to official figures recently released.

Those fields showing 1947 increases over 1946 production figures were: Ontaria, from 122,032 to 130,135 bbl.; Lloydminster field, Saskatchewan, from 136,346 to 534,894 bbl.; and Fort Norman field, Northwest Territories, from 181,408 to 231,844 bbl.

Areas showing declines were: New Brunswick, from 28,581 to 23,128 bbl.; Alberta, from 7,138,532 to 6,809,482 bbl.; and Turner Valley, from 5,937,362 to 5,022,350 bbl. Taber, Vermilion, and Conrad fields showed slight declines but were more than offset by the newer areas.

Natural gasoline production in Turner Valley decreased in 1947 to 427,225 bbl., compared to 434,210 bbl. in 1946.

The new Leduc field delivered 363,393 bbl. during the 10½ months it was in production. Lloydminster increased from 76,187 to 304,707 bbl. and Steveville-Princess from 64,953 to 106,950 bbl.

Sinclair-Wyoming Posts Amsden Price Schedule

A price schedule for the new Amsden pay oil at Wertz dome, Carbon County, Wyoming, has been posted by Sinclair-Wyoming Oil Co. For below 20°-gravity oil the posted price is $2.10 per barrel with a 2-cent gradation per degree to $2.52 for 40° and above. This is the same price listing as posted for other oil at Wertz and is retroactive to 7:00 a.m., February 26.

PERSONALS

Production Executive Is Veteran Engineer

HAROLD W. MANLEY, newly appointed manager of production of the Mid-Continent division of Barnsdall Oil Co., began working for the company first in 1928 as a roustabout in Seminole field, Oklahoma, during a summer school vacation.

Upon graduation from Oklahoma A. & M. College, where he received a degree in petroleum engineering, he joined the company's engineering department in 1929, working subsequently on production, pipe-line, and gas-gasoline department projects.

In 1935 he was appointed assistant chief production engineer for the Mid-Continent division, and in 1939 succeeded A. J. Schlosser as general superintendent of the gas-gasoline department.

He was named to his present post February 4. His duties include supervision not only of the gas and gasoline departments but also the engineering and production departments.

Oliver S. Hagerman, president and general manager of the Charleston, W. Va., group of companies of the Columbia Gas & Electric Corp., was elected a member of the executive board of the American Gas Association at the recent board meeting in New York. He fills the unexpired term of **R. G. Barnett** of Portland, Ore.

C. V. Lisman, Jr., has resigned as South Arkansas district geologist for the G. H. Vaugn and Big West drilling companies and is opening an office in Magnolia, Ark., as consulting geologist. He has also worked with the seismograph divisions of Phillips Petroleum Co. and Gulf Oil Corp. in the West Texas and Gulf Coast areas.

George W. Dimock, Wichita Falls, Tex., independent operator, has succeeded **J. H. S. Bonner** as president of the North Texas Oil and Gas Association, effective March 1.

H. H. Holman, Stanolind Oil & Gas Co. petroleum engineer, central division, has resigned to join the consulting firm of Mayer & Achtschin at Dallas.

M. E. Goodin, Petroleum Information, Inc., has been elected temporary president of the Petroleum Club of Denver. Other temporary officers include: **James Donoghue,** MacKinnie Oil & Drilling Co., vice president; and **H. P. Macauley,** independent oil operator, secretary-treasurer.

Floyd L. Martin, vice president in charge of refining and the sales division of Sunray Oil Corp., has been named executive vice president. Martin, who joined Sunray in 1930, has long been active in the refining phase of the industry and has directed operations of the company's refineries. He became a vice president of Sunray in 1935 and a member of the board of directors in 1941.

A seven-member board of directors has been elected by the Houston Oilmen's Club. Members are **A. D. Wilbur,** Humble Pipe Line Co.; **E. V. Shannon,** Hamon Oil & Refining Co.; **V. V. Bright,** Gulf Oil Corp.; **Thomas W. Ackley,** Scurlock Oil Co.; **Sam Lucas,** The Texas Co.; **V. D. Griffin,** Pan American Pipe Line Co.; and **George D. Blocker,** District Production Corp.

L. R. Caskey, district land man in San Antonio for Continental Oil Co., has resigned, effective March 1, to become an independent operator.

Ralph W. Hill, Stanolind Oil & Gas Co. mechanical engineer, is on a 3-month leave of absence to attend the Air Forces air command and staff school at Maxwell field, Alabama. Hill is a major on the staff of the 340th Bomb Group (reserve) in Tulsa.

L. Schepers, production manager of N.V. de Bataafsche Petroleum Mij. (Royal Dutch-Shell), has returned to The Hague, after a business trip through South America and the United States. Schepers was formerly manager for Shell in Venezuela.

Perry T. Shores, district superintendent at Guymon, Okla., for Phillips Petroleum Co., has been transferred to the South Burbank district as superintendent to replace **E. R. Leisure,** who has been moved to Guymon to replace Shores. Other transfers within the company include: **M. R. Hayes,** West Texas district, superintendent to the western division office at Midland, Tex., as assistant division superintendent, to replace **Freeman H. Egolf,** who has been moved to Oklahoma City as assistant regional superintendent, northern region; **D. A. Chase,** Big Spring district superintendent, to replace Hayes; **A. W. Mallow** to succeed Chase; and **W. A. Roberts,** senior engineer, eastern division, to the Bartlesville, Okla., office.

James F. Fair, of the Texas City, Tex., styrene plant of Monsanto Chemical Co., is one of four Monsanto technologists who have been selected by the company to receive leaves of absence at full salary for an academic year of study at universities of their choice. Others are: **John Fincke,** central research department, Dayton, Ohio; **Walter M. Davis,** Everett, Mass., plant; and **Earl L. Will,** of the organic chemicals division at St. Louis.

J. C. Finley, chief geologist for Midstates Oil Corp., Tulsa, has resigned to join Kerr-McGee Oil Industries, Inc., Oklahoma City, as manager of exploration. Finley, a graduate of the University of Kansas in 1929, was associated with Phillips Petroleum Co. for 8 years in the geological department before joining Midstates in 1937 as chief geologist.

C. I. Holliman, district production superintendent for West Texas and Southeast New Mexico for The Texas Co., has resigned to become an independent in Ardmore, Okla. He will be associated with **H. R. Gibson.** Holliman had been with The Texas Co. more than 14 years.

To the men in the drilling industry . . . Thanks!

Goodall *Flexo* Rotary Hose has been on the market just one year—but during that year sales exceeded our fondest expectations. We at Goodall want to thank you for your confidence.

We knew *Flexo* Hose was good because we thoroughly tested it before it was announced. These tests proved that it was the strongest, longest-wearing hose ever developed and it would stand severe treatment without damage.

But we didn't expect such overwhelming acceptance. As a result, we couldn't step up production fast enough to make prompt deliveries. Some of you had to wait—we hope that *Flexo* Rotary Hose performance repaid you for your patience.

Your suggestions and criticisms were largely responsible for the development of both *Flexo* Rotary Hose and Barney Couplings. We appreciate your suggestions because they help us give you the kind of products you want—rather than the kind we think you should want.

Even now we are working day and night to develop better products. In the meantime, you can buy Goodall *Flexo* Rotary Hose and other Goodall products with full confidence that they are the best available.

Barney

GOODALL
FLEXO
LONG LIFE Rotary Hose
BARNEY COUPLINGS—the only couplings stronger than the hose—are standard on Goodall Flexo Rotary Hose.

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DISTRIBUTORS: Texas and Louisiana — Houston Oil Field Material Co. — Wilson Supply Co. Oklahoma — Iverson Tool Company.
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FACTORY AT TRENTON, NEW JERSEY.

PERSONALS

George Goodin has resigned his position as district engineer in East Texas for Ohio Oil Co. and moved to Casper, Wyo., to enter private consulting practice. He is succeeded by **T. L. Forehand,** formerly assistant district engineer.

C. Francis Beatty, a member of the board of directors of the Socony-Vacuum Oil Co., Inc., has been elected to the board of the National Industrial Conference Board, New York, an independent and nonprofit organization for research and education in the field of applied economics.

Dr. Charles F. Van Berg, Humble Oil & Refining Co. chemist at Baytown, Tex., has been added to the chemical engineering staff of the University of Texas.

Dr. James S. Cullison, assistant supervisor of Creole Petroleum Corp.'s geological laboratory in Caracas, will sail for Venezuela from New York March 19 following a 3-month business and vacation trip to the United States.

W. S. W. Kew, chief geologist for Standard Oil Co. of California, will attend the International Geological Congress in London this summer.

Jack Harris, geologist at Rangely field for California Co., has been transferred to the Denver office as assistant to **Jim Kirby,** exploratory supervisor for the western division.

O. C. Needham, assistant superintendent of production for Gulf Oil Corp. in the Fort Worth district, has retired after 30 years of service. He first joined Gulf in 1918 as a cable tool driller at Burkburnett, Tex.

C. A. Mix, formerly of Tyler, Tex., heads Standard Oil Co. of Texas, new division office in Dallas, to handle exploration work in East, North, and West Central Texas and in the Panhandle. Staff geologists transferred to Dallas are **G. W. Oliver** and **R. H. Griffin,** Tyler, and **Margaret Persons,** formerly of Wichita Falls.

R. DeChicchis, district manager of the land and geological department of Anderson-Prichard Oil Corp. in Midland, Tex., has resigned to become a consulting geologist. **W. H. Thams,** of the Midland geological staff of Anderson-Prichard, has been named to succeed DeChicchis.

George P. Alden, associate petroleum engineer for the United States Geological Survey, Mid-Continent region, at Tulsa, has resigned to join Barnsdall Oil Co. as petroleum engineer. He will continue, among other activities, with secondary-recovery work. **Marshall F. Stiles, Jr.,** associate petroleum engineer for the Survey, Tulsa office, has been transferred to the Oklahoma City office.

New officers of the East Texas section of the American Institute of Mining and Metallurgical Engineers are, seated, D. W. Akins, Jr., Ohio Oil Co., Shreveport, chairman, and Don M. Kerr, Kerr Engineering & Construction Co., Kilgore, vice chairman. Standing are Phil J. Lehnhard, East Texas Engineering Association, Kilgore, director; Jack M. Shepherd, Humble Oil & Refining Co., Tyler, secretary-treasurer; Woodrow W. Leonard, Youngstown Sheet & Tube Co., Shreveport, director; R. T. Wade, Schlumberger Well Surveying Corp., Shreveport, director; Ralph Ludwick, Stanolind Oil & Gas Co., Greggton, director; and L. H. Dial, East Texas Salt Water Disposal Co., Kilgore, director. Not shown is Riley A. Aucoin, Humble Oil & Refining Co., Tyler, director

O. L. Ely, former manager in charge of order and distribution for Anchor Petroleum Co., Tulsa, has

O. L. ELY

P. E. GRAY

been named manager of the West Coast division for the company, and the newly formed Los Angeles office placed under his direction. **P. E. Gray** has been named in charge of the company's recently opened branch office in Casper, Wyo. **E. S. Carley** has been named to succeed Ely. Anchor Oil Co. of Houston, export affiliate of Anchor Petroleum, recently moved into its new offices in the City National Bank Building.

Douglas Collier, graduate of the University of Colorado, and **Jerome Wright,** formerly with the Nebraska Geological Survey and the United States Geological Survey, have succeeded **R. J. Gill** and **R. L. Kretz** as members of the geological staff at Wichita for California Co. Gill and Kretz resigned to form the Geologic Service Co.

A. R. Winzeler, formerly district geologist at Jackson, Miss., for Stanolind Oil & Gas Co., has been named Canadian division geologist. Other recent appointments within the company include: **R. F. Hodder,** formerly senior geologist in the Houston division office, to district geologist, South Texas district, San Antonio; **J. C. Johnston,** formerly senior geologist in the Wichita office, to district geologist, Mississippi-Alabama district, Jackson, Miss.; **N. S. Whitmore,** formerly in the engineering and construction section of the manufacturing department in the general office, Tulsa, to field project engineer in charge of construction of the Slaughter natural gasoline plant, Levelland, Tex.; **C. B. Pierce,** formerly in the engineering and construction section of the manufacturing department in the general office, Tulsa, to field project engineer in charge of construction of the natural gasoline plant at Elk Basin, Wyo.; **W. E. Phillips,** to party chief of a seismograph crew, Hobbs, N. M.; and **W. C. Wagner** to party chief of a seismograph crew at San Angelo, Tex.

A. W. Ambrose, president of Cities Service Oil Co., Bartlesville, Okla., has been elected a director of Cities Service Co, to succeed the late B. G. Tremaine of Cleveland, Ohio.

Harold M. Offutt, research and sales engineer for Jefferson Lake Sulphur, Inc., has resigned to become production manager of Sid Richardson Carbon Co., Fort Worth. In 1942 Offutt became superintendent of production of the Copolymer Corp.'s synthetic plant at Baton Rouge, La. **Frank Andrews,** formerly with Phillips Petroleum Co. as manager of the chemical products department, has been appointed sales manager of Sid Richardson.

J. W. Boice, who was with the Petroleum Administration for War for nearly 4 years, and has since been serving in the valuation department of the Interstate Commerce Commission, has returned to the Interior Department building as transportation expert for the Oil and Gas Division.

J. T. OXLEY

John T. Oxley, formerly secretary and assistant treasurer of Warren Petroleum Corp., Tulsa, and manager of its gas division, has been elected president of the recently organized Texas Natural Gasoline Corp., an affiliate of Edwin B. Cox & Jake L. Hamon, Dallas. Oxley studied mathematics and petroleum engineering at the University of Tulsa. He first joined Amerada Petroleum Corp. in the production and revenue department. He was assistant manager of that department in 1935 when Warren acquired the entire natural gasoline department of Amerada. In 1940 Oxley was made manager of the gas division for Warren and placed in charge of new plant developments and gas purchases and sales. He was elected assistant treasurer and assistant secretary in the same year. In 1943 he was named secretary of Warren.

H. W. Dodge, board chairman of Air Products, Inc., and former vice president of The Texas Co., is chairman of the Red Cross Chemicals, Paper and Petroleum section. **Walter L. Faust,** vice president of Socony-Vacuum Oil Co., Inc., is head of the petroleum division.

H. R. Arnold has succeeded **A. V. Walker** as general manager of Socony-Vacuum Oil Co., Inc.'s Levant division. **A. L. Lanckton** has replaced **F. M. Smith** as area manager in Athens. Both Walker and Smith have retired. Arnold started working for Socony-Vacuum as a foreign trade student in 1919 and has served in Bulgaria, Turkey and Greece. Lanckton was formerly a teacher in Roberts College, at Istanbul.

SHIFTS—

C. G. Haynes, foreman, Magnolia Petroleum Co., Carlsbad to Portales, N. M.; **Hayden L. McDonald,** engineer, Pan American Production Co., Kountze to Corpus Christi, Tex.; **E. Glenn Albright,** foreman, Atlantic Refining Co., Ozona to Slaton, Tex.; **R. W. Blackburn,** engineer, Continental Oil Co., Big Spring to Ozona, Tex.; **John R. Feeser,** engineer, Stanolind Oil & Gas Co., Brownfield to Sundown, Tex.

Tom B. Campbell, engineer, Stanolind Oil & Gas Co., Corpus Christi to Houston; **Howard R. Born,** geologist, Magnolia Petroleum Co., Houston, Tex., to Shreveport, La.; **Roy S. Case,** superintendent, Humble Oil & Refining Co., Kingsville to Ponta, Tex.; **M. R. Hayes,** superintendent, Phillips Petroleum Co., Odessa to Midland, Tex.; **W. H. Terry,** superintendent, Wheless Drilling Co., Delhi to Homer, La.; **A. H. Kirkpatrick,** superintendent, Reno Oil Co., Vivian, La., to Electra, Tex.; **James T. Dorland,** engineer, Gulf Oil Corp., Centralia, Ill., to Seminole, Okla.

Robert J. Moffatt, geologist, Carter Oil Co., Jackson, Miss., to Shreveport, La.; **Gene B. Caperton,** engineer, Stanolind Oil & Gas Co., Midwest to Casper, Wyo.; **George Berlin,** superintendent, Skelly Oil Co., Tulsa, to Bay City, Tex.; **F. M. Stewart,** engineer, Stanolind Oil & Gas Co., Tulsa to Casper, Wyo.; **F. C. Austin,** engineer, Shell Oil Co., Inc., Wichita Falls, Tex., to Wichita, Kans.; **J. T. Webster,** engineer, Magnet Core Barium Corp., New Iberia to Victoria, Tex.; **Dan A. Truesdell,** superintendent, Universal Oil Products Co., Wichita, Kans., to Beaumont, Tex.

Robert D. Fitting and **J. Robert Jones** have joined **Ralph U. Fitting, Jr.,** Midland, Tex., petroleum geology and engineering consultant. The new firm, Fitting, Fitting & Jones, will continue consulting work in geology and engineering phases of the oil industry.

DEATHS

Povl Ostergaard, 49, chief process engineer of Gulf Oil Corp., died February 17 in Pittsburgh, Pa. Ostergaard joined Gulf in 1926 and worked on early developments of the thermal cracking processes. He invented and developed the Gulf Polyform Process. He also held patents dealing with thermal cracking, fractionation, isomerization, and catalytic cracking.

Henry L. Rankin, 66, who was associated with Gulf Oil Corp. in Houston for 26 years prior to his retirement in 1947, died February 22 in Houston. Rankin had served as assistant insurance commissioner of Gulf's production and pipe-line organization and secretary and treasurer of Gulf Casualty Co.

George Stuart Monroe, 55, petroleum research chemist for Universal Oil Products Co. for the past 24 years, died February 25 in Chicago, Ill. He held many patents dealing with the treatment of hydrocarbons and had written a number of scientific papers on the subject.

Roy B. Jones, 65, former manager of Panhandle Producing & Refining Co., died February 29 in Wichita Falls. He moved from Illinois to Cushing, Okla., in 1911 to become general manager of Colonial Refinery Co. and to operate the Jane Oil & Gas Co.

Henry L. Oliver, 84, consulting petroleum geologist, died February 28 in Hot Springs, N. M. Besides having worked many areas in the United States, Oliver also had done work in Russia and Nome, Alaska.

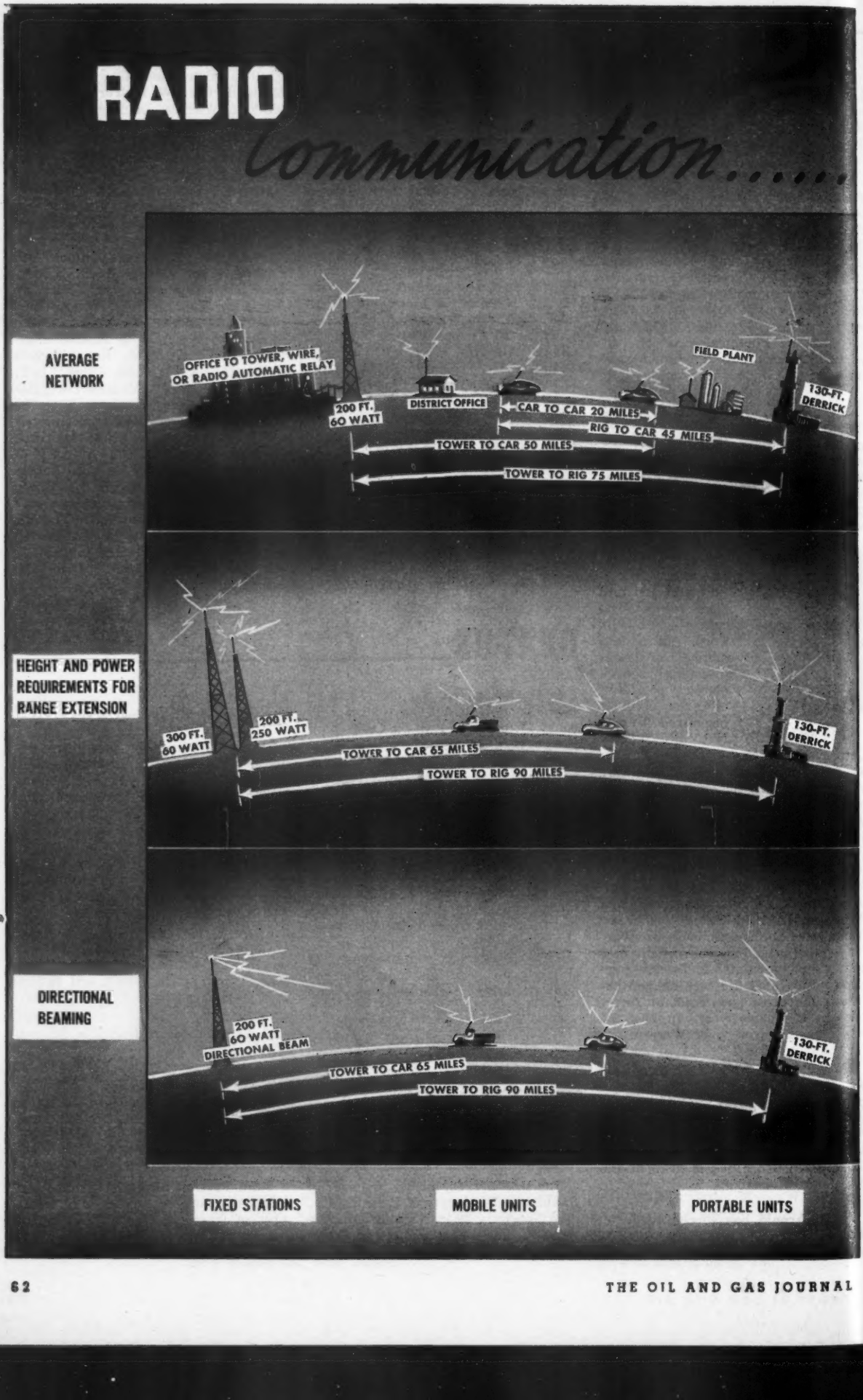
Frank R. Webster, 63, formerly active in the Alberta oil development as president of Highwood-Sarcee Oils, died recently in Calgary.

Clarence R. Mazey, first oil and gas supervisor for Montana and for many years prominent in state oil activities, died recently in Vernal, Utah.

C. Leonard Smith, active in drilling and refining in the Kevin-Sunburst area, died recently in Denver.

Francis Martin, superintendent for Illinois Mid-Continent Oil Co., was killed recently in an automobile accident in Keenburg, Ill.

John Preston Sutton, 71, industrial relations manager and assistant treasurer of Ohio Oil Co. at the time of his retirement in 1942, died February 25 in Findlay, Ohio.


RADIO
Communication.....
AVERAGE NETWORK
OFFICE TO TOWER, WIRE, OR RADIO AUTOMATIC RELAY
200 FT. 60 WATT
DISTRICT OFFICE
CAR TO CAR 20 MILES
RIG TO CAR 45 MILES
TOWER TO CAR 50 MILES
TOWER TO RIG 75 MILES
FIELD PLANT
130-FT. DERRICK
HEIGHT AND POWER REQUIREMENTS FOR RANGE EXTENSION
300 FT. 60 WATT
200 FT. 250 WATT
TOWER TO CAR 65 MILES
TOWER TO RIG 90 MILES
130-FT. DERRICK
DIRECTIONAL BEAMING
200 FT. 60 WATT DIRECTIONAL BEAM
TOWER TO CAR 65 MILES
TOWER TO RIG 90 MILES
130-FT. DERRICK
FIXED STATIONS
MOBILE UNITS
PORTABLE UNITS

. . . Speeds Action for Drilling Wells, Pipe Lining, Field Plants

by George Weber

This new, unitized portable transmitter-receiver unit is designed specifically for installation on drilling rigs. It is built for easy rigging up and tearing down and will withstand normal field handling without damage

RADIO communications now play a vital part in many oil operations. Technical advances of the next few years are expected greatly to broaden radio's usefulness to all divisions of the petroleum industry. This stake in current employment and expanding future use dictates that the industry as a whole lend vigorous support to those representatives assigned to advise the Government on petroleum's unique needs, and to secure for the industry the use of space on the radio spectrum commensurate with its national importance.

The value of radio in conducting field operations is now being recognized by a growing number of drilling contractors and producers. Recent improvements in frequency-modulation transmission provide technically, a highly satisfactory means of instant continuous communication between field and office. Since the mobile, remote character of most field operation precludes economical wire communication, radio represents not a substitute but a sole means of satisfactory contact.

Radio's advantage is an old story to the geophysical services and pipe liners. The first use in exploration dates back to 1925, when four radio sets were reported in use by seismograph crews. Since that time radio's use, limited mainly to the higher-frequency channels for short-range transmission, has become almost standard for the field party. Pipeline companies, particularly gas transporters and distributors, were not long in adapting radio to their needs for tying extensive gathering and transmission systems into direct communication with dispatchers.

The most recent use of radio in the oil and gas fields applies primarily to drilling operations and promises to open the widest field for radio in the industry, subject to the availability of enough channels set aside for that purpose. Progress in radio technique suggests further important applications which will concern all divisions of the industry.

But the limiting factor will not be technical in nature. There are not enough frequencies in the fixed radio spectrum to afford every prospective user exclusive use of a frequency or band free of interference. Between the various classes of prospective licensees a stiff competition has developed for allocation of blocks and this competition will surely intensify. In addition to the growing needs of industry, Government transportation, commercial communication, science, and public-safety services, two relatively new groups, television and F.M. broadcasting, strongly represented in Washington, are making powerful bids for added space on the spectrum. The whole situation amounts to a scramble for assignments and the Federal Communications Commission faces the monumental task of determining the relative importance of various interests as a basis for fixing an allocation policy.

The present status of radio use in the petroleum industry is illustrated in the accompanying table listing the number of companies licensed to operate private networks in two FCC districts; No. 9 embracing the Texas Gulf Coast, and No. 10 including Oklahoma, New Mexico, and the remainder of Texas. These networks vary from small local two or three-set units to extensive systems employing fixed stations and scores of mobile and portable transmitter-receiver units. The figures represent only those companies which have already obtained licenses. It is estimated that more than twice as many additional drilling contractors, for

OIL-INDUSTRY OPERATORS OF INDUSTRIAL RADIO NETWORKS IN THE SOUTHWEST (EXCEPTING MARINE TRANSPORT)

		Number of companies licensed					
FCC category—	Dist.	Integrated Oil Cos.	Independents*	Drilling contractors	Pipe line companies	Geophysical companies	Pipe-line contractors
Provisional	9	7	4	1	1	4	..
	10	7	3	7	14	1	3
Utility	9	..	..	..	3	..	..
	10	4	1	..	11	..	..
Geophysical	9	3	2	..	..	16	..
	10	12	2	..	..	18	..
Experimental	9	1	2	..	..	..	..
	10	4	1	5	..	3	..
Special emergency	10	..	1	..	2	..	..

*Includes some producers also engaged in contract drilling.

Below: Dispatcher's office of United Gas Pipe Line Co. at Carthage, Tex. Radio Dispatcher E. Dittmore can contact immediately with any of the field men by means of this two-way F.M. Motorola radiotelephone. The console connects by telephone line with nearby 250-watt transmitter. Left: Meter and well attendant, L. M. Taylor, at heater located 4 miles east of Carthage gas field, getting his instructions by radio

example, are considering radio, or have applied for licenses.

The increased efficiency resulting from early field uses of radio is mainly responsible for the high interest in radio in that division of the industry. As an example, F. B. Paine Drilling Co. of Dallas, the first drilling contractor to adopt F.M. radio, reports definite savings over 18 months of operation. The Paine network* originally comprised seven transmitter-receiver sets, including three portable units installed on the contractor's three active rigs, and four mobile units in two partners' automobiles and two tool pushers' pickup trucks. During the first year of operation with the network, two rigs were added in the North Texas area.

In spite of the increase in drilling activity, field mileage of all company cars and trucks showed a sharp reduction. The ability to report trouble promptly and to transmit orders directly to rigs and tool pushers resulted in a reduction of 60 per cent in rig down time during the first year of radio operation. This factor alone more than offset the initial and maintenance costs of the network. Reduced downtime resulted, further, in much less day-work billing to customers whose ready access to information on drilling progress amounted to an added service. Supervision problems were simplified to the extent that the same tool pushers who operated three rigs were able to supervise five operations satisfactorily.

The network initially cost about $7,000. Maintenance during the first year of operation cost the contractor about $5 per month per mobile unit and $15 per month per portable unit. Although the FCC estimate on equipment life gives an F.M. network 7 to 9 years, oil-field use is considered to reduce the efficient life of a contractor's network to 5 years. On this conservative basis, Paine estimates that a complete system, including a fixed station at the home office, would cost about $50 per rig per month, including maintenance and 5-year amortization. These costs will probably average higher in larger networks where one or more expensive antenna towers may be necessary.

While actual saving accruing from use of the radio network are impossible to reduce to fixed amounts, the contractor estimates that the downtime eliminated by constant contact with rigs saved the initial cost of the network during the first 6 months of operation. Another more recently licensed, drilling contractor estimates a 75 per cent payout of his network in 6 weeks' use. Much of this saving was realized in keeping rigs running when snow and ice largely isolated some operations.

Large Network Installed

Most radio networks concerning field operations are relatively small ones, similar to the Paine setup. In contrast, some very extensive systems have been licensed. They generally incorporate drilling, production, and other phases of operation and are maintained for the most part by the larger companies. One of the largest of these networks is operated by an independent, West Production Co. of Houston. When completed, it will blanket all of Texas and parts of five or more southwestern states. At present the system consists of 10 fixed stations, 2 experimental units, 8 portable units, and 95 mobile transmitter-receiver sets installed in cars, trucks, airplanes, and boats. This network is being installed without the normal concern for payout over a set period, having cost the operator well over a half million dollars to date. A large part of that cost includes the erection of several antenna towers at key points in the network, ranging from a 300-ft. tower at San Antonio to a 700-ft. tower under construction at Madisonville, and another of the same size planned for Southwest Texas between Laredo and Eagle Pass.

The network will include not only drilling and production operations on the Gulf Coast and in Southwest Texas, but also affiliated ranching and lumbering interests in New Mexico and Texas, and eventually, mining projects in Texas and Alabama. While radio coverage of this scope may not be justified economically in many cases, the owner considers that over a long period it will be practical.

Aside from the routine transactions over such networks, radio provides a potential service which can be very important in emergency. This factor is appreciated by pipe-line companies, especially those engaged in gas distribution. When wire communication

*"F.M. Radio Takes to the Oil Fields," by George Weber, The Oil and Gas Journal, October 5, 1946, page 62.

New mobile units like this one installed in a tool pusher's truck, can be installed out of the way behind the driver's seat. The hand-set is within reach of the driver. The loud speaker is left "on" whenever the truck is occupied, and gives an instant signal on incoming messages. Whips on the cowl and cab are antennas for the receiver and transmitter sets

fails during storms, radio has proved invaluable in maintaining service and meeting the rapidly changing fuel demands which often accompany bad weather.

As an example of the few but important emergency uses of radio, West cites an instance where considerable property damage and possibly loss of life was avoided by means of rapid communication. A well being completed near Madisonville last year blew out through a ruptured line, blanketing the surrounding area with gas high in hydrogen sulfide content. The poison gas prevented personnel from approaching the well to shut it in. The accident was reported immediately by radio through the Houston fixed station, by very high-frequency automatic voice relay to the head offices downtown. Within an hour a plane arrived at the field with gas masks, the crew promptly shut the well in, and the threat of spreading gas was halted before fire or other serious damage occurred. The West network figured in another example of emergency use where its value is hard to estimate. During the Texas City disaster, three mobile units and priority on channels were given the FBI and the local sheriff's office.

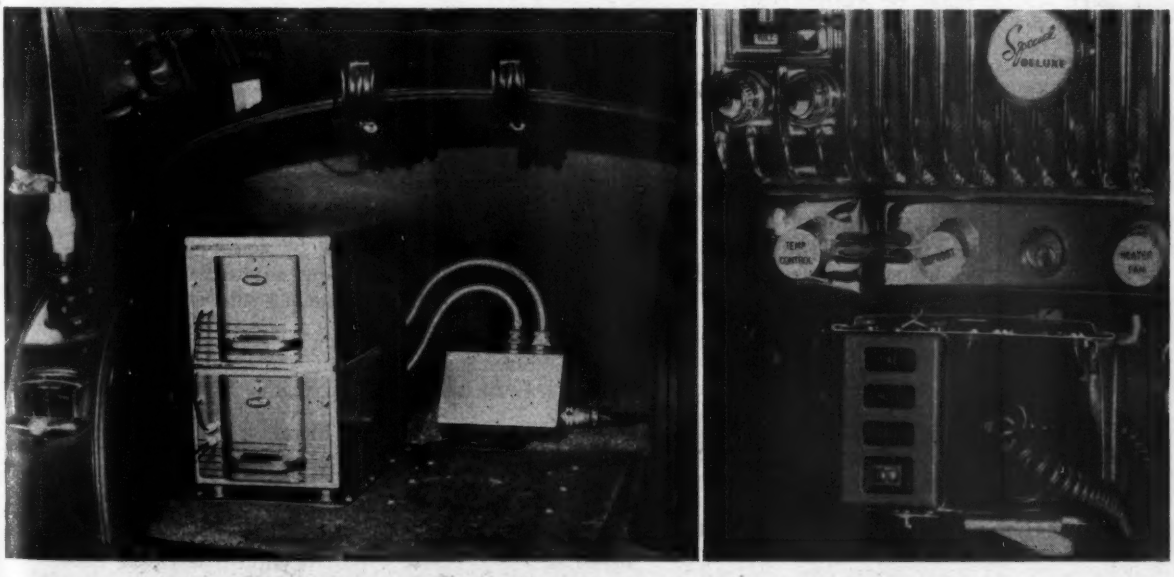
In another recent incident, radio is credited with saving a life. An oil-company employe working on a gas-transmission line heater was warned by radio of a freeze down the line and a dangerous pressure buildup. He left in his car forthwith, and had driven only a quarter mile when the line burst, demolishing the heater.

Types of Field Networks

The service to be expected of an average oil-field network in normal terrain has been fairly well determined. Data given in the title page drawing are based on experience of established networks and extensive field tests conducted last year in North and West Texas by engineers of Communications Engineering Co. of Dallas in conjunction with General Electric Co.

The ranges of various fixed stations are those at which reliable communication is possible. As a rule contact is possible at greater distances barring the screening of hills or damping effect of certain surface soils. Terrain directly affects range, since F.M. transmission is essentially line-of-sight, i.e., the short radio waves do not follow the earth's curves. As a result West Texas tests showed much better range in the cap-rock area than in the sand hills. In the hilly country at the south end of the Permian basin trend dead spots occured in low spots within the normal range of antennas located at Midland and Odessa. On the other hand, loca-

(Continued on page 86)



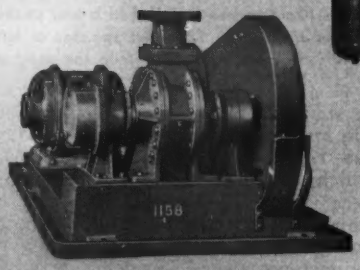
Philco-Kellogg mobile radio telephone mounted in a light sedan. The transmitter-receiver units are located in the luggage compartment, one above the other, on a single shock mounting. Call-number response can be arranged for single, group, or fleet call. If privacy of communication is desired, the selective call system can be set to provide "lockout" of all other units of the fleet by muting their receivers. Under this condition, the receivers locked out will show a busy signal on their control units

FOR REFINERS—

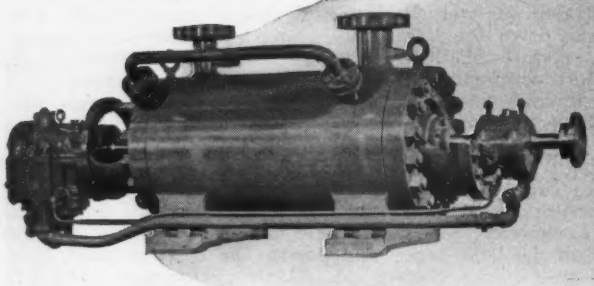
Matched Equipment — Matchless Service

COUPLINGS	*Dresser Mfg. Div.*
CENTRIFUGAL COMPRESSORS	*Clark*
CENTRIFUGAL PUMPS	*Pacific*
ROTARY POSITIVE BLOWERS	*Roots-Connersville*
RECIPROCATING GAS COMPRESSORS	*Clark*
STORAGE TANKS	*Stacey Bros.*
ENGINES	*Clark*
EXHAUSTERS	*Roots-Connersville*
INERT GAS GENERATORS	*Roots-Connersville*

PACIFIC—*Vertical Types*



ROOTS-CONNERSVILLE
—*Cycloidal Rotary Pump*



PACIFIC—*Centrifugal Pumps*

CLARK—*Centrifugal Compressors*

You can get all transfer equipment—with variations to fit your peculiar problems—from the family of Dresser Industries. The *family* angle is important. The several operating member companies do specialize—Clark Bros. in reciprocating compressors and engines; Roots-Connersville in Rotary Positive Blowers; Pacific Pumps in centrifugal hot oil pumps; and Roots has still a different centrifugal. But each is engineered to operate with the others for best efficiency.

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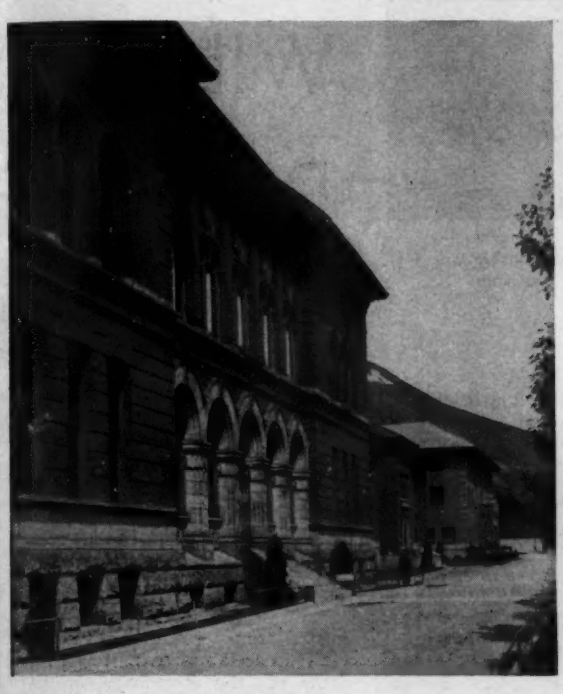
NO. 15 IN A SERIES

PETROLEUM ENGINEERING SCHOOLS

MONTANA SCHOOL OF MINES



Main Hall in foreground, which houses petroleum-engineering department

John Bukvich, head, Department of Petroleum Engineering

Dr. Eugene S. Perry, head, Department of Geology

SALIENT FACTS AND FIGURES

General.—Located at Butte. Established in 1893. State controlled, financed by mill levy and revenue from the sale and rental of the School of Mines land grant. The School of Mines is a unit of the University of Montana. The other component institutions are Montana State University at Missoula, Montana State College at Bozeman, Montana State Normal College at Dillon, Eastern Montana State Normal School at Billings, and Northern Montana College at Havre. Enrollment at the School of Mines is 400.

Buildings and grounds.—Eight major buildings on an 11.5-acre tract overlooking the city from the west. Petroleum engineering department, except for gas-measurement laboratory in Mill Building, is set up on third floor of Main Hall.

Tuition.—Montana students have no tuition charge; nonresidents pay $37.50 per semester. Fees for all students come to about $100 yearly.

Calendar.—Semester system. September through May. No summer classes are offered.

MONTANA SCHOOL OF MINES, a unit of the University of Montana, is devoted exclusively to the training of students for service in geology, metallurgy, mineral dressing, mining, and petroleum; the five major divisions of the mineral industry. With this end in view, special emphasis is placed upon a thorough foundation in mathematics, chemistry, physics, mechanics, geology, and other basic engineering subjects.

Correct and effective use of English is stressed, especially as applied to the writing and delivery of technical reports. Likewise, the increasing importance attached to labor relations, public relations, and financial aspects of the industry is reflected in the devotion of eight semester hours of the senior year to the economics of the mineral industry.

The school's library, in its field, is one of the most complete in the Northwest. A well-selected collection of books covering the fundamental sciences and their application to mineral industry engineering is supplemented by an extensive collection of documents and publications of various states, technical societies, and institutions. As a U. S. Government document depository, the college regularly receives the literature of all government bureaus whose activities are concerned with the mineral industry.

During the past few years, an increasing number of the school's mining and geology graduates have found places in the petroleum industry. Due in no small part to their requests, but even more so to the insistence of many of the oil companies operating in the state, courses are this year being offered, for the first time, leading to a bachelor of science degree in petroleum production engineering. Twenty-five students, all juniors, are now enrolled.

In all, 22 hours of instruction are given by the department. (Figures in parentheses are semester credit hours.) Introduction to the Petroleum Industry (3), background of the industry, leasing and exploration, state and federal regulations; Drilling (5), lectures and laboratory study of drilling muds, cements, samples and logs; Natural Gas (2), problem course including gas-measurements laboratory; Refining Processes (2); Production (4); Reservoir Studies (4), pressure maintenance, calculation of reserves, includes core analysis laboratory; Production Engineering Problems (2).

A comprehensive grounding in geology is insured by a sequence of courses including physical, historical, structural, and petroleum geology; mineralogy, petrology, sedimentation, and field mapping.

Summer field trips are conducted after the freshman and junior years, and inspection trips after the junior and senior years. For registration in senior petroleum courses, at least one summer's work in the oil fields is required.

BAILEY BRIDGE adapted to Louisiana WILDCAT DRILLING

1.—Unloading Bailey-bridge material at installation site at Humble Oil & Refining Co.'s landing in the Bayou des Glaise area, Louisiana

by Ed Short

"Getting on location" often is a major problem in swampy Gulf Coast areas. A new development by Humble in such operations is discussed. Sequence photos outline the various steps.

IN the Bayou des Glaise area, approximately 20 miles west of Baton Rouge, La., Humble Oil & Refining Co. has utilized a Bailey bridge as a floating-end loading ramp to accommodate the movement of trucks to and from barges in land-water drilling operations.

The Bailey bridge, named after its British designer, was employed during World War II by the Allied armies in both theaters of operation. It proved capable of supporting even the heaviest of military loads, and because of its mobility, simplicity, rapidity of construction, and adaptability, it was considered a major factor in the successful solution of military-transportation problems.

The principal feature of the prefabricated Bailey bridge is its design which permits it to be pushed forward on rollers over the gap to be spanned, during the process of construction. Essentially the bridge consists of two parallel trusses formed from 10-ft. pin-connected truss sections which support the deck structure.

The Bailey-bridge unit consists of sufficient materials and tools to construct one 80-ft. and one 70-ft. triple-single bridge. They were purchased by the Government at a unit cost of approximately $32,000. As surplus material Humble secured a unit at a price of $85 per ton, or a total cost of $7,500, shipped prepaid to the Intracoastal Terminal at Harvey, La.

Humble's drilling operations in the Bayou des Glaise area presented an unusual transportation problem. This area is located approximately 20 miles south of the terminal at Krotz Springs, and is accessible only by water. The locations themselves, however, are situated on dry land in many cases. The access route, therefore, requires the construction of a road varying in length from several

2.—Concrete bridge seat is poured. Note projection for rocking rollers. 3.—Rocking rollers are placed on 8-by-10-in. timbers laid on stepped portion of the concrete cap

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4.—About 25 ft. behind the rocking rollers a trench was dug to firm ground and a pair of plain rollers was set on a timber foundation, as shown in photograph. Another set of rollers was placed 25 ft. behind the second pair. Tops of all rollers were set at the same elevation

5A-5B-5C — Construction of the launching nose. A pair of panels was placed on the forward rocking rollers and a transom was inserted and clamped in place. A second pair of panels was then pinned to those in position, first at the upper chord and then at the lower, and a second transom and a set of sway braces were inserted. The third pair of panels brought the launching nose onto the plain rollers

Construction was similarly continued until the five bays of the launching nose were completed and supported on the three sets of rollers. Thereafter, construction of the bridge itself was commenced and the structure was pushed forward as each bay was completed

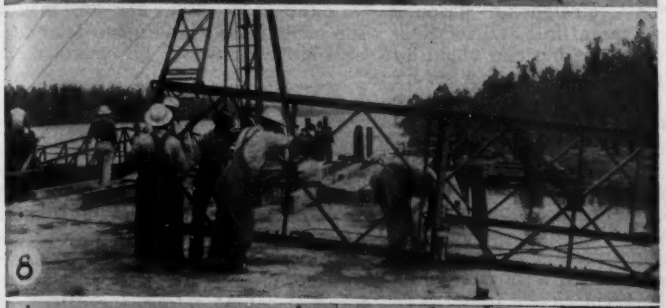
When all five bays of the launching nose and two bays of the bridge proper had been erected, the lower panel pins between the second and third bays were removed. Fig. 5C shows launching nose completed. The forward portion of the nose has been jacked and is held in position by links, thereby affording clearance between end of bridge and edge of the barge

6.—After the completion of the launching nose and three bays of the bridge proper, a small dragline, as shown in this photograph, was brought in to swing the heavier bridge parts into position and to move the bridge forward after the completed portion became too heavy to roll manually by the six-man crew

hundred to several thousand feet and the provision of a suitable land-water connection capable of carrying the heavy loads incident to drilling activity. In an effort to arrive at the most economical installation for work of this kind, Humble decided to experiment with the Bailey bridge. It was placed in operation and effected a substantial saving in providing all necessary land-water facilities.

The first installation was made in connection with the drilling of Schwing Lumber & Shingle Co. C-1, a wildcat located 1,850 ft. east of Whiskey Bay Pilot Channel in Bayou des Glaise district. At point of construction the channel is wide, deep, and swift of current. Banks are steep and the water level varies between plus 5 and plus 26 ft. mean Gulf level. The truck ramp, therefore, had to be capable of adjustment in order to accommodate land and water traffic at both high and low-water stages. To meet this requirement the 80-ft. Baileybridge ramp was hinged at its ends to permit adjustment imposed by variations in water level. The various steps in the installation of the Bailey bridge by Humble is presented pictorially in this article.

7.—When the launching nose passed onto the barge a set of rocking rollers without bearings was placed beneath it, to facilitate forward movement. As each bay passed the rollers it was dismantled (Fig. 8) and the parts were stacked on the deck. After the launching nose links had been removed, a set of plain rollers, as shown in this photograph, was substituted for the rocking rollers on the barge and movement and dismantling was continued until the end of the bridge itself rested on the plain rollers. These operations completed the launching of the bridge



8.—In completing the bridge both ends were secured by special U-bolt clamps which hold end transoms to the bearing, thereby preventing displacement due to vibration. The addition of end posts and ramps completed the bridge. 9A.—Closeup of bearings used on both shore end and barge end of bridge

10.—The Bailey bridge, completed by Humble in 240 man hours. The structure was secured against lateral movement by means of ⅛-in. cables fastened to the lower chords of the floating end of the bridge and fixed to anchor piling by means of turnbuckles

11.—Bailey-bridge ramp in use as truck hauls engine from barge to wildcat location

CRACKING AND THERMAL REFORMING

. . . Pennsylvania Stocks

by Davis Read *

PRODUCTION of motor gasoline from Pennsylvania crude presents some refining problems not common to the majority of other crudes. The heavier crude fractions which would normally be cracked to increase the yield and quality of motor fuel in refineries processing other types of crude, are utilized more advantageously in the manufacture of lubricating oils and waxes by Pennsylvania refiners. Accordingly, the ratio of high-octane-number cracked gasoline, produced from gas-oil cracking, to the lower-octane straightrun fractions produced is decreased. In addition, Pennsylvania straightrun-gasoline cuts are quite paraffinic and relatively low in octane rating and volatility and are processed under rather severe conditions to enable the average Pennsylvania refiner to meet specifications in present over-all gasoline blends. As a result of these situations and further increase in octane rating which might be required is, in general, more difficult to achieve by changes in operation of existing thermal equipment than is normally the case in other refineries.

*Universal Oil Products Co., Chicago.

Purpose of this study is to present a summary of certain data available on the processing of Pennsylvania crude with particular reference to methods of increasing yield and octane rating of the gasoline and the yields of distillate fuels produced.

Rather complete inspections were obtained on Pennsylvania straightrun gasoline fractions having end points of 225°, 275°, and 325° F. and these data are plotted on Fig. 1. The straightrun gasolines are low in sulfur content and have good lead susceptibility as would be expected.

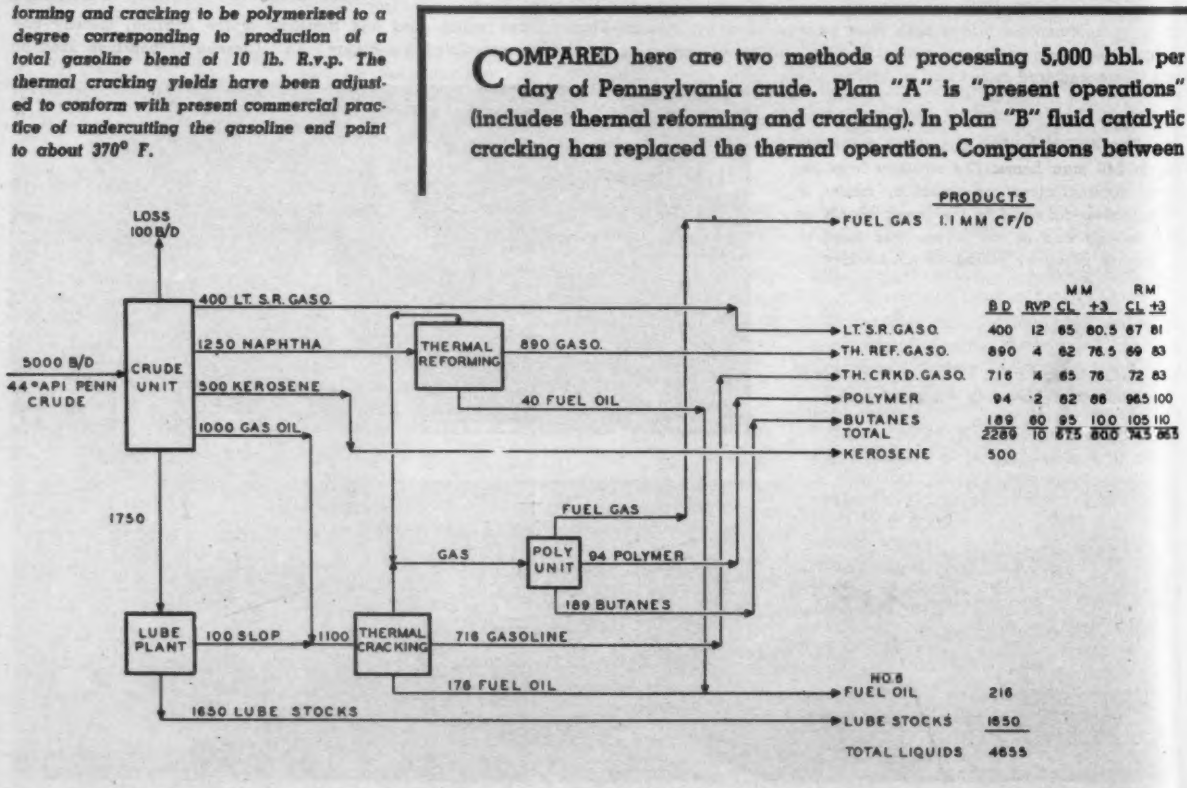
U.O.P. Thermal Reforming

The thermal reforming operation is widely used by Pennsylvania refiners for processing straightrun naphtha fractions either in a light oil coil operated in conjunction with a thermal cracking unit or in a separate reforming heater. While it is possible to reform severely, if necessary, to increase octane rating, the attendant loss in gasoline yield is at times prohibitive. A careful study of the reforming operation often reveals that the over-all liquid recovery can be increased without sacrifice in gasoline quality or, conversely, that over-all gasoline quality can be improved without sacrifice in production by certain changes in methods of processing. Selection of the proper gasoline fraction to be reformed and the conversion level at which the reforming

PLAN A

Here the crude oil is fractionated to produce light straightrun gasoline, 24-octane naphtha, kerosine, and gas-oil cracking stock. The remaining topped crude is charged to a lube-oil plant. The naphtha is assumed to be reformed to 62 motor method octane on a debutanized basis, and the gases from reforming and cracking to be polymerized to a degree corresponding to production of a total gasoline blend of 10 lb. R.v.p. The thermal cracking yields have been adjusted to conform with present commercial practice of undercutting the gasoline end point to about 370° F.

COMPARED here are two methods of processing 5,000 bbl. per day of Pennsylvania crude. Plan "A" is "present operations" (includes thermal reforming and cracking). In plan "B" fluid catalytic cracking has replaced the thermal operation. Comparisons between



operation is carried out are two important factors to be considered.

Properties of charge stocks (Table 1) and pilot-plant results (Figs. 2 and 3), as obtained in thermal reforming two Pennsylvania naphthas are given herewith. The gasoline-yield octane data are presented on the basis of producing debutanized reformed gasolines. It is apparent from these graphs that it is more advantageous, from the standpoint of over-all barrel octanes, to process all of the heavy naphtha which is available for gasoline blending at an intermediate or low conversion level rather than to process only a part of the same naphtha at high conversion level. For example, from Fig. 2, 100 bbl. of 25-octane naphtha can be reformed to yield 90 bbl. of 43-octane debutanized gasoline, while if only 50 bbl. of naphtha are reformed to an 80 per cent yield and blended with 50 bbl. of unreformed naphtha the resulting 90 bbl. of blend will have an octane number of only approximately 38. The corresponding polymer plus butane yields will be practically the same in the two cases.

TABLE 1—CHARGE-STOCK PROPERTIES—U.O.P. THERMAL REFORMING PENNSYLVANIA STRAIGHT-RUN NAPHTHAS

Stock—	Oct. naphtha 24 m.m.	Oct. naphtha 34 m.m.
Gravity, °A.P.I.	55.1	53.8
Total sulfur, per cent	0.06	0.04
Mercaptan sulfur, per cent	0.002	....
Octane numbers:		
F-2 motor method	24	34
+1 cc. TEL/gal	36.5	45
+2 cc. TEL/gal.	43.5	....
+3 cc. TEL/gal.	49.5	....
F-1 research method	26.5	....
+1 cc. TEL/gal.	38	....
+2 cc. TEL/gal.	45.5	....
+3 cc. TEL/gal.	51.5	....
Characterization factor	12.15	11.98

The selection of charging stock for the reforming operation has considerable bearing on the over-all octane-number picture. In most cases studied it is more advantageous to prefractionate the full-range gasoline and reform only the heavy naphtha than to reform the full-range gasoline. While no data are given here to confirm this on Pennsylvania stocks, it has been shown that prefractionation of a 400° F. e.p. full-range Mid-Continent straightrun gasoline and reforming of the 250°-400° F. naphtha resulted in an increase of 2 to 5 points in motor method octane rating as compared with thermally reforming the full-range gasoline to the same over-all yield. Aside from gaining a better over-all yield octane relationship, however, possibly an even greater advantage resulting from the

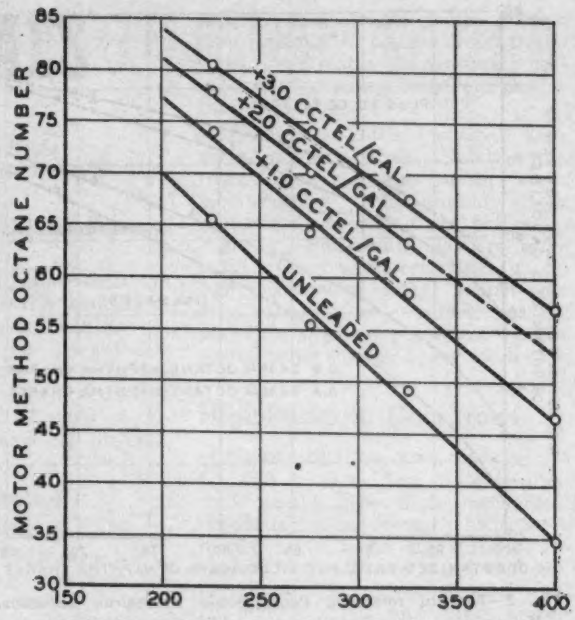
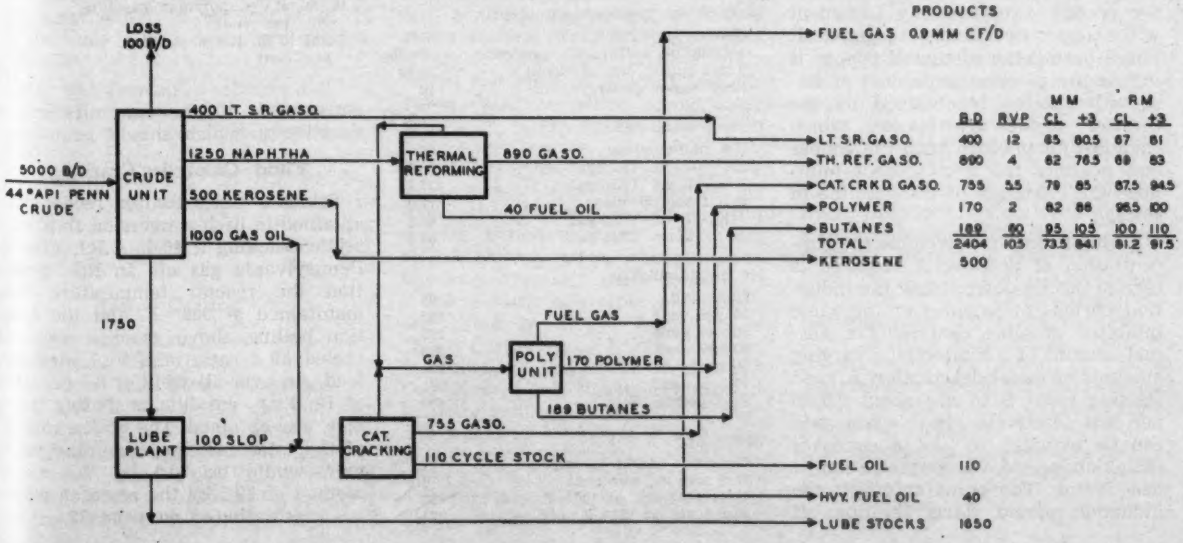


Fig. 1—Effect of end point on motor-method octane number of Pennsylvania straightrun gasoline

plans A and B show that it is possible to increase the over-all gasoline yield by 115 bbl. per day, or by about 5 per cent, and its leaded motor method octane rating by 4.1 points when catalytic cracking is substituted for thermal cracking. In addition, the over-all liquid recovery is increased slightly and 110 bbl. per day of light distillate fuel is produced at the expense of No. 6 fuel production.

PLAN B

Here the crude distillation and reforming yields are the same as in A ("present operation") and the 1,100 bbl. per day of gas oil plus lube-plant slop is charged to the catalytic cracking unit. (Yields used are the same as those given in the article in Table 4.) In this scheme, however, it is possible to polymerize all of the available propylene and butylenes without encountering a vapor-pressure deficiency



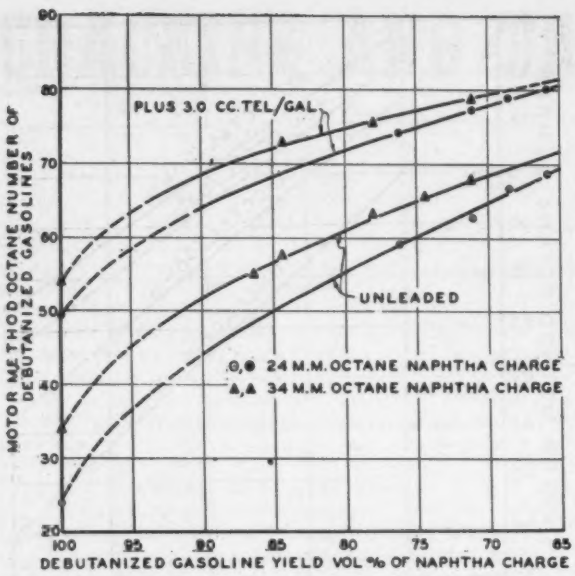

MOTOR METHOD OCTANE NUMBER OF DEBUTANIZED GASOLINES
PLUS 3.0 CC TEL/GAL
UNLEADED
●,● 24 M.M. OCTANE NAPHTHA CHARGE
▲,▲ 34 M.M. OCTANE NAPHTHA CHARGE
DEBUTANIZED GASOLINE YIELD VOL % OF NAPHTHA CHARGE

Fig. 2—Thermal reforming Pennsylvania straightrun naphthas. Motor-method octane number vs. debutanized gasoline yield

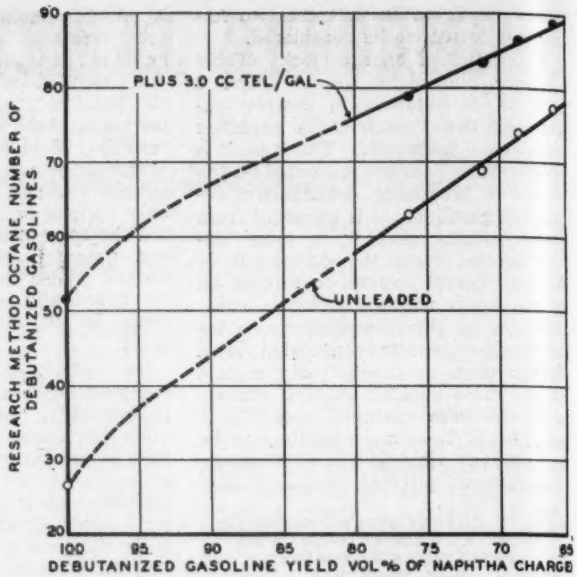

RESEARCH METHOD OCTANE NUMBER OF DEBUTANIZED GASOLINES
PLUS 3.0 CC TEL/GAL
UNLEADED
DEBUTANIZED GASOLINE YIELD VOL % OF NAPHTHA CHARGE

Fig. 3—Thermal reforming 24 M.M. octane Pennsylvania straightrun naphtha. Research method octane number vs. debutanized gasoline yield

elimination of light fractions from the reforming charge is the increased heater capacity made available for additional heavy naphtha reforming.

U.O.P. Thermal Cracking

Data given in Tables 2 and 3 show the results obtained by pilot-plant two-coil thermal cracking at 37.6° A.P.I. gravity Pennsylvania gas oil. The yields obtained in this test are somewhat higher and the octane number is somewhat lower than would be expected in present commercial operation since a 400° F. e.p. gasoline was produced in the pilot plant while the usual commercial practice at present is to undercut the gasoline to possibly 370° F. e.p. to increase octane rating to 67-68.

Both the thermally cracked and reformed gasoline are low in sulfur and are readily sweetened by treatment with copper-sweetening reagents. It might be mentioned that if copper is left in the gasoline, a product of improved stability is obtained by the use of metal deactivators which chemically combined with the copper and possibly the iron present minimize the oxidation of the gasoline in storage.

A simple test to determine the concentration of deactivator required is carried out by determining the induction periods of samples of the same inhibited gasoline containing a normal amount of inhibitor plus varying amounts of metal deactivator. A good starting point is to use about 0.0005 per cent deactivator. In this way data can be obtained to plot a curve of induction period vs. concentration of deactivator. The point at which the induction period starts leveling off corresponds to the concentration of deactivator which should be used.

TABLE 2—CHARGE STOCK AND YIELDS—U.O.P. TWO-COIL THERMAL CRACKING PENNSYLVANIA GAS OIL

Charge:	
Gravity, °A.P.I.	37.6
Sulfur, wt. per cent	0.05
Cold test, °F.	+15
Universal viscosity at 100° F., sec.	45.5
Characterization factor	12.20
Yields (per cent of charge to cracking unit):	
Ethane and lighter gases, cu. ft./bbl. charge	268
Propylene, liq. vol. per cent	4.4
Propane, liq. vol. per cent	7.7
Butylenes, liq. vol. per cent	5.8
Butanes, liq. vol. per cent	6.2
400° F. e.p. gasoline, vol. per cent:	
Debutanized basis	68.1
10 lb. R.v.p. basis	73.5
Residuum	15.5

TABLE 3—PRODUCTS PROPERTIES—U.O.P. TWO-COIL THERMAL CRACKING PENNSYLVANIA GAS OIL

10 lb. R.v.p. gasoline (untreated):	
Gravity, °A.P.I.	61.0
Mercaptan sulfur, wt. per cent	0.005
Total sulfur, wt. per cent	0.02
Reid vapor pressure, lb.	10
Octane numbers:	
F-2 motor clear	66
+1 cc. TEL/gal.	72.5
+3 cc. TEL/gal.	77.5
F-1 research clear	72.0
+1 cc. TEL/gal.	80.5
+3 cc. TEL/gal.	85.5
100 ml. distillation:	
I.b.p., °F.	95
10 per cent	135
30 per cent	195
50 per cent	253
70 per cent	304
90 per cent	361
End point, °F.	396
Residuum:	
Gravity, °A.P.I.	11.1
B.s. and w., per cent	0.1
Universal vis. at 100° F., sec.	430
Furol vis. at 122° F., sec.	24

TABLE 4—CHARGE STOCK AND YIELDS—U.O.P. FLUID CATALYTIC CRACKING PENNSYLVANIA GAS OIL

Charge:	
Gravity, °A.P.I.	40.4
Sulfur, wt. per cent	0.08
Conradson carbon on 10 per cent bottoms, per cent	0.03
Cold test, °F.	+10
Aniline point, °F.	180
Universal viscosity at 150° F., sec.	38.1
Characterization factor	12.20
Yields (per cent charge to cracking unit):	
Ethane and lighter hydrocarbons, cu. ft./bbl. of charge	183
Propylene, liq. vol., per cent	3.7
Propane, liq. vol. per cent	2.4
Butylene, liq. vol. per cent	3.6
Butanes, liq. vol. per cent	8.2
400° F. e.p. gasoline, vol. per cent:	
Debutanized basis	68.6
10 lb. R.v.p. basis	72.3
Cycle stock, vol. per cent	10.0
Coke, wt. per cent	6.0
10 lb. R.v.p. polymer gasoline, vol. per cent	12.1
Total 10 lb. R.v.p. gasoline, vol. per cent	84.4

Fluid Catalytic Cracking

Tables 4 and 5 contain recent data obtained in high-conversion fluid catalytic cracking a 40.4° A.P.I. gravity Pennsylvania gas oil. In this operation the reactor temperature was maintained at 900° F. and the fraction boiling above gasoline was recycled at a ratio of 2 to 1 on fresh feed. An over-all yield of 8.4 per cent of 10 R.v.p. gasoline, including polymer, was obtained. The octane ratings of the total gasoline, including polymer, would be 80.5 by the motor method or 89.5 by the research meth-

(Continued on page 92)

PROGRESS IN METALS

by W. L. Nelson

Consulting Engineer

Cutting and Lubricant Compounds

A NEW tapping compound and threading oils for use in tapping and threading of ferrous metal, including stainless steels, and aluminum, have been announced by James L. McManus Co., 2121 South Wabash Avenue, Chicago. The tapping compound, a blended chemically neutral combination of animal and mineral lubricants, is nontoxic and contains no white lead or lead derivatives.

It is a viscous material intended for brush application. The rate of conversion to oil is directly in proportion to heat generated by the cutting tool, thus giving sufficient lubricant to the lead threads of the tap and permitting it to cut free. While developed for use as a tapping and threading lubricant, the tapping compound can be used as an additive to chlorinated and sulfurized mineral-base cutting oils at present employed.

Drawing Compounds

A series of lubricating compounds developed especially as modern lubricants for drawing, sheeting, and stamping nonferrous metals is being manufactured by Glyco Products Co., Inc., 26 Court Street, Brooklyn. These compounds provide a film which acts as a temporary corrosion inhibitor, and permit continuous lubrication. They are available in various forms, ranging from liquids to solids and from water-soluble or water-dispersable materials to oil-soluble materials. One compound in the series of 12 compounds is both water and oil dispersable.

For wet drawing, a solution of 2 to 5 per cent compound and water usually is the most satisfactory. In some processes, the stock to be drawn dry may be dipped into the solution before the operation, then allowed to dry and then processed. This makes possible reduction of the amount of lubrication at the die.

Sulfur Cutting Oil

A cutting oil combining active sulfur content with absence of disagreeable odor has been announced by Gulf Oil Corp., Pittsburgh. The sulfur in these oils is chemically combined by a process so that it is active over the entire range of a cutting operation. Their efficiency is ascribed to the fact that the amount of chemically active sulfur (rather than the total percentage of sulfur contained) governs cutting oil performance.

The overcoming of disagreeable odor is said to make available the advantages of these highly chemically active sulfur oils to all types of operations with assurance of pleasant operating conditions.

Cutting Coolant

A liquid concentrate used with 10 to 75 parts water for high-speed production of tough alloys has been announced by Anderson Oil Co., Inc., Portland, Conn. According to the manufacturer, the coolant is a true solution, not an emulsion and neither evaporates nor becomes rancid. It is said to have low interfacial tension and because of this is able to get between the tool and the chip with unusual rapidity and thereby prevent the formation of heat.

A survey from the November 1947 issue of Materials and Methods.

Hard Facing Application

THE application of hard surfacing deposits mainly by welding is primarily useful for services that involve wear. Thus, some depth is required in the deposit rather than the superficial type of protection or hardening afforded by carburizing, plating, or nitriding. Direct applications to oil and gas services are:

Applications in the oil industry—Core barrels, core shoes, core heads, core catchers, ditch digger teeth, pins and bearings for rock bits, hot-oil pump pistons, Ratigan rockers, seismograph bits, side-tracking mills, valves and seats of all kinds, refinery valve seats, mud-pump valves, rotary drill bits, pump shafts, pump runners, shaft sleeves, cat heads, roller bits, wall-scraper blades, double-pin subs, underreamer lugs, bailer bottoms, mud-pump rods, hot-oil pump sleeves, thrust washers, mills, reamers, washover shoes, knuckle joints, two-way drag bits, cable tools.

These and many other applications are listed by H. S. Avery in his "Hard Surfacing by Fusion Welding," published by American Brake Shoe Co., New York. Obviously, the oil industry employs hard facing on much equipment and machinery that is not listed above. Therefore, a few of these auxiliary applications are given:

Excavating.—Dipper bucket teeth, ditcher teeth, ditcher shoes, track rollers, drag-scraper teeth, suction pipe manhole pieces, road-ripper teeth, wear plates, dredge-pump casings, dredge-pump impellers, mainshaft bearings.

Machinery.—Lathe centers, keyways, guides, chisels, clutch cams, trips, counter bores, rocker arms, metal-cutting tools, thread gages, center drills, boring tools, guides.

Power.—Boiler-tube cleaners, valve seats, crusher teeth, centrifugal pump shafts, conveyor links, poppet-type drip valves, needle valves, nozzles, post-hole diggers, pulverizer blades, shafts, pump sleeves, screw conveyors.

High-Strength Cast Irons

AN investigation was made of 12 cast irons to find a composition that would give high mechanical properties. The irons, which were melted in a basic arc furnace, included two unalloyed irons, a nickel-chromium (2 nickel-0.2 per cent chromium) iron, and nine nickel-molybdenum (1.4 nickel-0.6 per cent molybdenum) irons. The latter irons were divided into three main groups, with about 2.35, 2.6 and 2.8 per cent carbon, and with varying silicon content in each group.

Tensile strengths of at least 56,900 psi. and particularly high impact values were obtained with the nickel-molybdenum irons containing 2.7 to 2.9 per cent carbon and over 1.7 per cent silicon. The carbon may be lowered to 2.6 per cent if the silicon is increased to about 2.3 per cent. Although the best mechanical properties were obtained with the nickel-molybdenum irons containing less than 2.7 per cent carbon and 1 to 2.5 per cent silicon, the higher strength of these lower-carbon and lower-silicon irons was offset by their greater susceptibility to porosity. The following composition was selected as optimum since it combines high strength with an absence of porosity: 2.7 to 2.9 carbon; 1.7 to 1.9 silicon; 0.6 to 0.8 manganese; 1.5 to 1.7 nickel; 0.5 to 0.6 per cent molybdenum.

A supplemental investigation was made to determine the most favorable conditions for inoculation with calcium. The amount of calcium silicide added was sufficient to increase the silicon content of the iron by about 0.2 to 0.25 per cent. Additions were made in the furnace and at the spout; only the latter proved really efficient. Inoculation had a definitely beneficial effect on all the mechanical properties in spite of the higher silicon content of the inoculated iron.

No positive conclusions could be drawn as to the effect of casting temperature except that porosity was more marked in the samples cast at lower temperatures.

An abstract of "Special High-Strength Irons," by Delbart and Potaszkin, Founderie (French) No. 18, June 1947, p. 673, taken from November 1947 issue of Materials and Methods.

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Benton Field Unit

A standout cooperative enterprise on unitization of gas-condensate properties

by W. L. Horner and E. G. Trostel

UNITIZATION of the Benton gas-condensate reservoirs, long before any actual cycling could take place, required much engineering work of an advanced nature. The efforts fell in two divisions, geological engineering and reservoir engineering. During the past 3 years the many pertinent factors concerning the pool were gathered and studied. Finally, the mass of data and all of the various problems were consolidated for orderly attack and solution.

The Assignment

1. To determine the areal limits of economic production from the "D" and Bodcaw sands unitized in the field, and the unit boundaries which coincide with the limits of economically recoverable hydrocarbons from the "D" sand reservoir.

2. To determine the volumes of economically recoverable gas, condensate, and oil from both reservoirs, underlying each of 164 separate tracts lying within the unit area.

The Benton Field Unit of North Louisiana represents an outstanding example of progressive thought and action on cooperative unitization of gas-condensate properties. The project is distinguished by farsighted cooperation among the principal interests in the field, practically from the date of discovery. The field was developed for cycling, and a unit agreement[1] was instrumented at an early date. Commercial production of gas and oil was deferred until plant completion and the unit began operations in January.

The unit agreement marked an important departure in providing for the determination of equity percentages and revision of the original tentative unit boundaries by a disinterested consulting firm. By common consent of all parties to the agreement; Barnsdall Oil Co. (unit operator), Sohio Petroleum Co., and the Grady H. Vaughn interests, the firm of DeGolyer & MacNaughton was retained to determine equities and unit boundaries. The first determination, to be followed 1 year later by a final revision, was presented before the Louisiana Department of Conservation and approved by that body in December. As an example of reserve estimation, this work represents the best contemporary technique not only of determining hydrocarbons in place, but of projecting expected recoveries under prescribed methods of cycling and subsequent depletion.

1. For details of the unit agreement, see article by George Weber, "Benton Unit Approaches the Ideal Pressure-Maintenance Project," The Oil and Gas Journal, January 11, 1947, page 56.

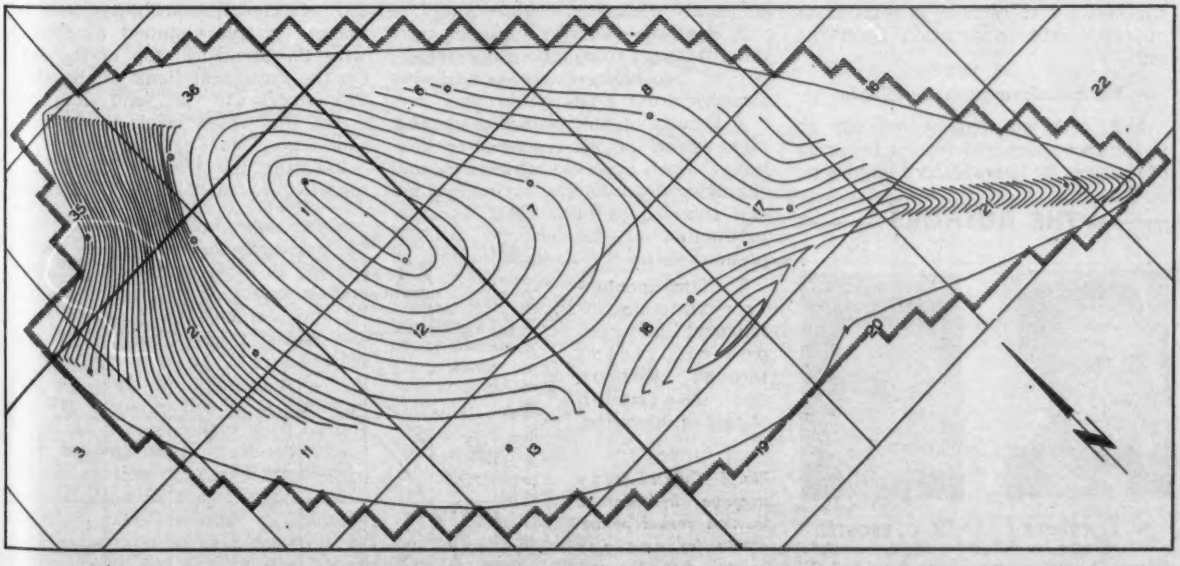


Fig. 1—Isopachous map of net thickness of "D" sand, Benton field. The original map was constructed to include 1-ft. isopachs for entire unit area. Here, however, the 1-ft. contour lines on the north and south flanks are omitted because of their extreme density

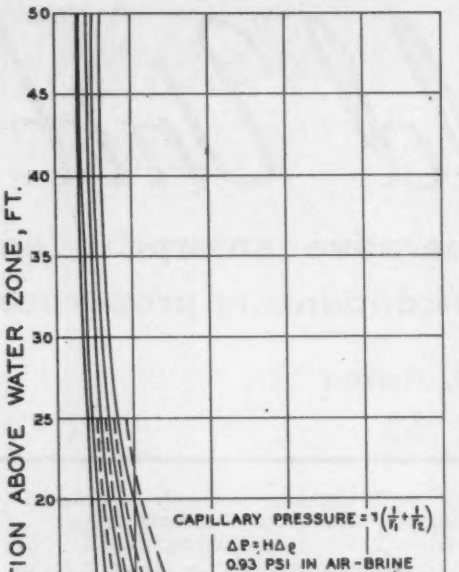


Fig. 2—Connate water versus elevation above gas-water contact for various permeabilities, "D" sand, Benton field

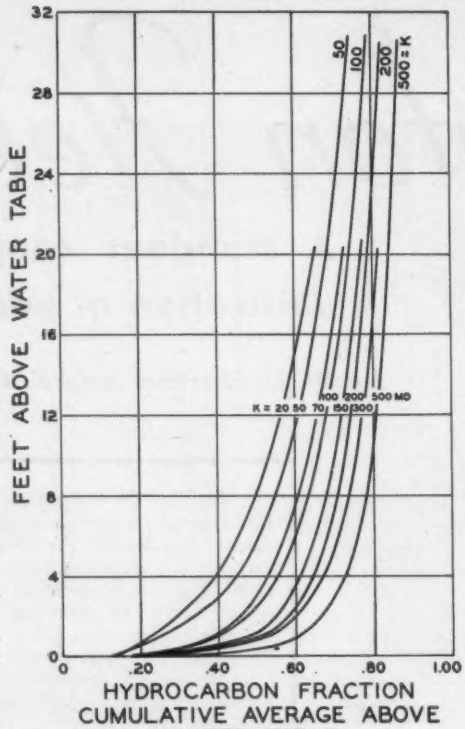


Fig. 3—Hydrocarbon fraction averaged for cumulative feet of sand above gas-water contact versus feet above gas-water contact, "D" sand, Benton field

3. Based on an assumed price of $0.04 per M.c.f. for gas and $1.25 per barrel for condensate and oil, to determine the equity in value of recoverable hydrocarbons underlying each tract with relation to total value of recoverable production from the unit.

Basic Information Available

1. A certified map scaled 500 ft. to the inch, prepared from a resurvey of the area by licensed civil engineers, showing boundaries of each tract, area of each tract and location of all wells.

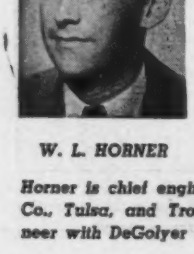
2. All data obtained from geophysical surveys, electric logs, core analyses, drill-stem tests, production tests and production samples. Due to carefully planned field development these data from 15 wells in the area were unusually complete and accurate.

3. Pressure - volume - temperature data obtained from laboratory analyses of recombined gas - condensate samples from both reservoirs.

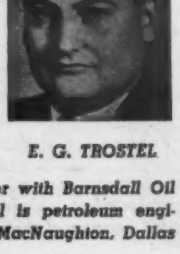
4. Details of the proposed cycling plan; sweep factors, economic cycling limits, final depletion pressure, and character of production during cycling and subsequent production of depletion.

5. Plant economics, extraction efficiency, and expected yields through cycling and depletion phases of operation.

THE AUTHORS



W. L. HORNER



E. G. TROSTEL

Horner is chief engineer with Barnsdall Oil Co., Tulsa, and Trostel is petroleum engineer with DeGolyer & MacNaughton, Dallas

Initial phase of the study concerned a determination of that acreage which should be included in the unit area. Structural tops of the "D" and Bodcaw sands obtained from electrical log correlations, were contoured on the base map. From core analyses, drill-stem and production tests, and electrical logs, the gas-water contact in the "D" sand and the gas-oil and oil-water contacts in the Bodcaw sand were assigned fixed subsea depths. Full accord on all structural markers and fluid contacts was reached by geologists and engineers representing the companies participating in the unit.

In plotting all maps, a uniform method of strict mechanical contouring was followed, interpolating between control points or extrapolating beyond them in a linear manner. This method, employed consistently, was considered the most equitable approach to the problem.

Limits of the producing areas were located on the map at the intersection of the gas-water, gas-oil, and oil-water contacts with the contours marking the tops of "D" and Bodcaw producing sands. On the northeast edge of the field, where the true top of sand permeability was not known, it was assumed to coincide with the structural top of the sand. On the northwest flank of the structure where the "D" sand shales out above the water level, the limit of production was determined by extrapolating the trend of sand thinning to zero. Since the "D" sand area

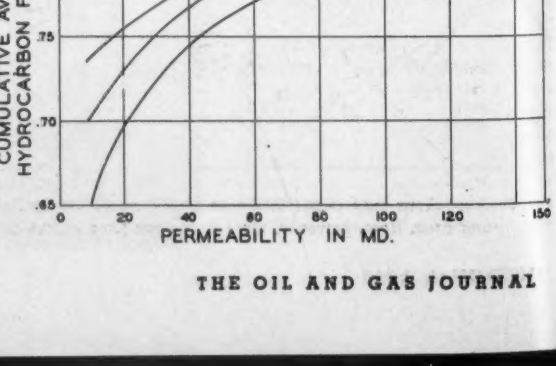


Fig. 4—Cumulative average hydrocarbon fraction versus permeability for various heights above the gas-oil contact, Bodcaw sand, Benton field

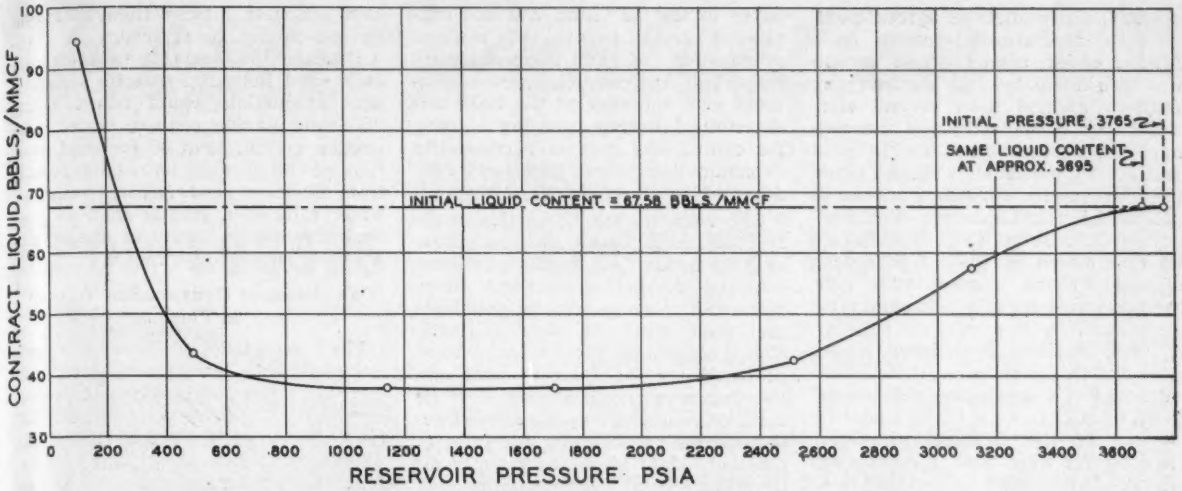

CONTRACT LIQUID, BBLS./MMCF
RESERVOIR PRESSURE PSIA
INITIAL LIQUID CONTENT = 67.58 BBLS./MMCF
INITIAL PRESSURE, 3765
SAME LIQUID CONTENT AT APPROX. 3695

Fig. 5—Contract liquid content versus reservoir pressure, "D" sand, Benton field

extends beyond Bodcaw production in all directions, its outer limits marked the revised Benton unit area. Such limits coincide with the outer boundaries of all standard rectangular 20-acre sectional subdivisions which overlie any "D" sand production. As outlined later, other corrective factors entered into fixing production limits and unit boundaries.

The revised area does not differ greatly from the original, tentatively agreed upon earlier in the field's history. The major deletions were dictated by interim drilling which showed a steeper dip than was previously estimated on the northwest. The major additions resulted from selection of a different basis for control. Originally estimated from geophysical and subsurface data, some productive limits were revised outwardly by continuation of trends indicated by subsurface geology alone.

Isopachous Maps

From all available well data: core descriptions and analyses, electrical logs, and drillers' logs, the gross thickness of both sands was determined to the nearest foot in each well, and isopachous maps of gross thickness of both sands were prepared. Application of the proper fluid contact elevations and other corrections to the gross thickness maps resulted in isopachous maps of net effective thickness of the oil and two gas-condensate reservoirs. (Fig. 1). All sand sections showing permeability greater than zero millidarcies were included. An exception to this rule was made in the basal Bodcaw. There a permeability distribution study showed that on the average, a 2½-ft. section of sand immediately above that sand showing zero permeability, had too high a connate-water saturation to be productive of hydrocarbons. As a result, the lower 2½ ft. of permeable Bodcaw sand was excluded from the net section.

The average porosity of each sand section in each well was then determined, and isoporosity maps were contoured for the "D" and total productive Bodcaw sand. Porosity varies vertically in the Bodcaw sand; increasing from a minimum at the base to maximum in the upper section, again decreasing toward the structural top of the sand section. Therefore, the preparation of isoporosity maps for net condensate and net oil sections in the Bodcaw sand required further corrections. From the isoporosity map of the entire section, an isoporosity map of the condensate portion was prepared using for control the porosity average of the condensate section of the sand in a well drilled near the top of the structure.

Data from three wells penetrating the Bodcaw oil section were plotted for porosity distribution versus height above the sand base. Then, from the isoporosity map of the entire Bodcaw producing section, a similar map for the oil section from its pinchout up structure to its region of maximum thickness was prepared using for control in the appropriate areas, the data from the three curves. For that portion of the map from the points of maximum section down structure, the average porosity was assumed to be the same as that of the entire Bodcaw section.

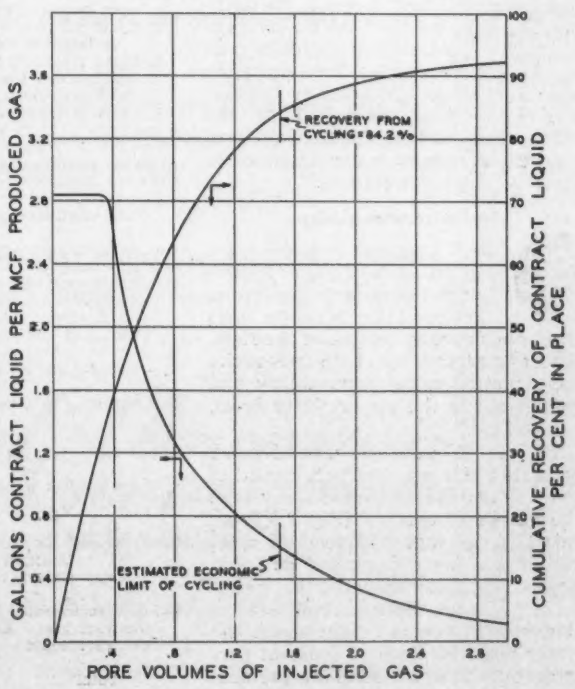

GALLONS CONTRACT LIQUID PER MCF PRODUCED GAS
CUMULATIVE RECOVERY OF CONTRACT LIQUID PER CENT IN PLACE
PORE VOLUMES OF INJECTED GAS
RECOVERY FROM CYCLING = 84.2 %
ESTIMATED ECONOMIC LIMIT OF CYCLING

Fig. 6—Calculated performance during cycling for permeability variation of 0.60, "D" sand, Benton field

Connate-Water Determination

The figures used for connate-water saturation in productive sands were subject to considerable checking by independent laboratories. At the outset, the determinations made by the Barnsdall laboratory, employing the capillary pressure or restored state method[1,2,3] were found to vary from an independent determination conducted for another member of the unit agreement. Consequently, before accepting either set of data, determinations were ordered on duplicate samples, from other reputable laboratories in different sections of the

country. These analyses agreed closely with the Barnsdall results. As a further check, connate-water saturation was calculated independently by Guyod's method from several electrical logs. A spot check of the connate-water saturation in the "D" sand section of a particular well was made using resistivity departure curves as prepared by Schlumberger Well Surveying Corp. From the formation factor determined by the Schlumberger laboratory on a representative core sample, connate-water determinations were made by two separate resistivity interpretations. Both agreed closely with the average connate-water saturation as originally determined by Barnsdall. In view of the majority support of the Barnsdall findings, their figures were used in computing equities in the unit.

The figures were available as connate-water saturation for each foot of productive sand cored in each well. These values were weighted by porosity to derive average connate water and average hydrocarbon fraction for each net producing section in each well by the following procedure.

For each foot of section in a well, the porosity hydrocarbon fraction, in per cent, was determined. For example, a sample representing 1 ft. of section shows a porosity of 20.1 per cent and a connate-water determination by capillary pressure of 12.2 per cent. The porosity hydrocarbon fraction is 0.201—(0.201 × 0.122) or 17.65 per cent, representing the fractional volume of the 1-ft. sand section occupied by hydrocarbons.

Average connate water for the entire section is then computed by dividing the difference between average porosity and average porosity hydrocarbon fraction, by the average porosity. The resulting figure is converted by subtracting from unity, to obtain average hydrocarbon fraction for the section penetrated by the well. Hydrocarbon fraction is used instead of connate-water fraction, to simplify later calculations.

Isohydrocarbon Maps

These well averages provided data for plotting contours of equal hydrocarbon fraction for both reservoirs by direct interpolation between wells in the upstructure section of the field. Flank contours for both reservoirs were plotted using permeability and height above the oil or water level, for control.

For the "D" sand, per cent of water saturation for various permeabilities was plotted versus elevation above the gas-water contact. (Fig. 2). From this plot, average hydrocarbon saturation data were computed and Fig. 3 was prepared, showing the cumulative average hydrocarbon saturation plotted versus height above the water table for lines of constant permeability. The variation of permeability in the "D" sand was not considered great enough to warrant preparation of an isopermeability map. The hydrocarbon fraction gradient near the edge of the field was determined directly from Fig. 3, using for control the various permeability determinations from various wells adjacent to the field flanks.

The isohydrocarbon fraction maps for the flanks of the gas-condensate and oil sections of the Bodcaw sand required further corrections, since permeability varies with height above the sand base, as does porosity. Charts similar to Figs. 2 and 3 were prepared for the Bodcaw sand and the data were cross plotted to show cumulative average hydrocarbon fraction versus permeability for lines of constant height above the gas-oil contact (Fig. 4). An isopermeability map was constructed for the Bodcaw sand. Then, by superimposing this map on the Bodcaw structural map, direct readings for permeability and height above the gas-oil contact were possible for all points on the edges of the productive structure. These values, referred to Fig. 4, provided points from which contours of equal hydrocarbon fraction were drawn.

Isohydrocarbon contours for the oil-productive Bodcaw were similarly derived, using plots of cumulative average hydrocarbon fraction versus permeability for constant height above the oil-water contact. Since control was obtained from permeability distribution data available from only three wells penetrating the Bodcaw oil section, the map for the oil section was less precise than that for the gas-condensate reservoir.

Relative permeability studies of each sand indicated that no condensate production would result from "D" sand having connate water saturation greater than 85 per cent and that no oil production would result from Bodcaw sand having connate-water saturation greater than 75 per cent. Productive limits of the sands were adjusted accordingly.

Calculation of Hydrocarbon Volume in Place

The isopachous, isoporosity, and isohydrocarbon maps prepared for the three reservoirs formed the basis for calculating hydrocarbon volume in place under each tract in the unit. The horizontal dividing plane method of planimetering was used to afford a maximum reading for each area enclosed by a contour. In computing volume, the trapezoidal formula, $V = h(a_1 + a_2)/2$ was used where ratio of successive decreasing areas was greater than 0.5. Where the ratio was less than 0.5, the formula for volume of the frustrum of a pyramid was used, $V = h/3\,(a_1 + a_2 + a_1a_2)$, where a_1 and a_2 are areas of horizontal planes passing through successive contours and h is the interval between contours.

In computing the volume overlying the horizontal plane passed through the largest valued contour on a tract, either the trapezoidal formula $V = ha/2$ or the pyramidal formula $V = ha/3$ was used, depending on the shape of the volume. Volume calcula-

TABLE 1—BENTON UNIT, "D" SAND RECOVERY AND VALUATION CALCULATIONS

Bases:
1. Area sweep of 85 per cent
2. Cycle 1.5 pore volumes and produce 84.2 per cent contract liquid for permeability variation of 0.6
3. Bleed reservoir pressure to 200 psia.
4. Produce 65.1 per cent of remaining contract liquid by depletion
5. Plant extraction efficiency = 80 per cent butanes + 98 per cent pentanes = 98.4 per cent
6. Plant fuel and shrinkage = 11 per cent

	Per cent
Contract liquid recovery during cycling = 0.85 x 84.2 x .984	70.5
Contract liquid recovery during depletion = (100 — 70.5) (.651) (.984)	18.87
Total contract liquid recovery	89.37
Gas used during cycling of 1.5 pore volumes = 11 per cent x 1.5	16.5
Gas remaining at end of cycling = 100 — 16.5	83.5
Gas left in reservoir at end of depletion	5.0
Gas produced during depletion	78.5
Plant fuel and shrinkage = 78.5 x 11 per cent	8.6
Total gas recovery	69.9

Hydrocarbons in place in 1 acre-ft. of hydrocarbon volume:

$$\text{Contract gas} = 43{,}560 \times \frac{3{,}695}{14.7} \times \frac{520}{688} \times \frac{1}{.867} = 9{,}545 \text{ M.c.f.}$$

Contract liquid = 9.545 × 67.58 = 645.1 bbl.

Recoverable hydrocarbons in 1 acre-ft. hydrocarbon volume:
Contract gas = 9,545 × .699 = 6,672 M.c.f.
Contract liquid = 645.1 × .8937 = 576.5 bbl.

Value of recoverable hydrocarbons in 1 acre-ft. hydrocarbon volume:	
Contract gas = 6,672 × $0.04	$266.88
Contract liquid = 576.5 × $1.25	720.63
Total	$987.51

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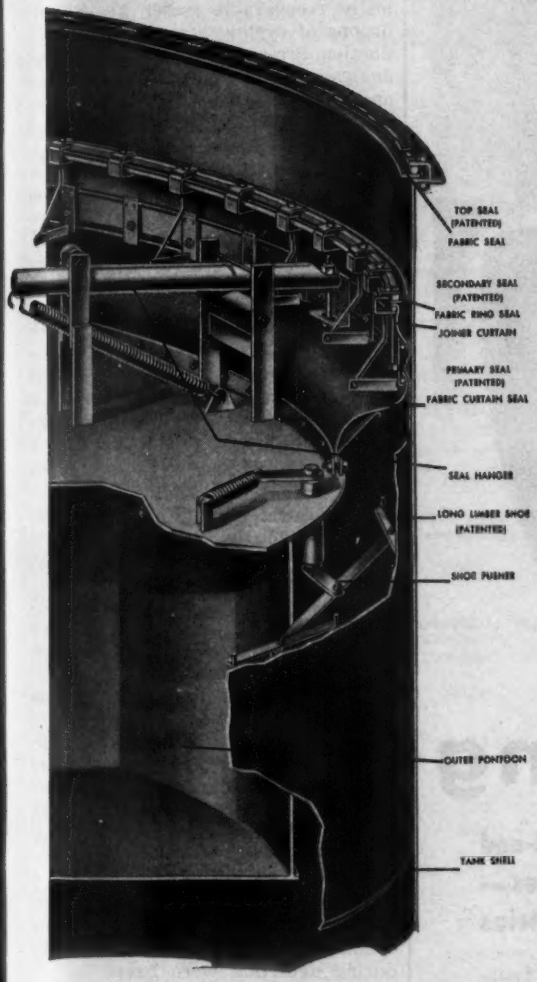

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tions for each tract gave acre-feet of sand volume, average porosity, and average hydrocarbon fraction whose product represented the volume of hydrocarbons in place under that tract.

Recovery Determinations

Having estimated reserves in place in the "D" and Bodcaw sands, the next step concerned a determination of what fraction of such reserves of gas condensate and oil was economically recoverable under given conditions of cycling and depletion production. Pressure-volume-temperature analyses of recombined samples of gas and condensate from both sands were made by independent laboratories.

Tests of samples taken from four "D" sand wells showed close agreement on characteristics of production from that principal reserve. The in-place ratio of liquid to gas for the four samples averaged 67.57 bbl. per M.c.f. of contract liquid (20 per cent of butanes and all heavier hydrocarbons). This agreed so closely with the 67.58-bbl. per M.c.f. ratio of the original sample taken in the field, that the latter was accepted as representative of reservoir conditions on January 1, 1946.

On the basis of P.V.T. data taken from tests of the original sample, a plot of contract liquid content of gas in place versus reservoir pressure was made from calculations by Dr. C. W. Ziemer of Barnsdall (Fig. 5). A similar plot was drafted from calculations based on representative samples of Bodcaw gas condensate. Satisfactory production samples of the sole Bodcaw oil well which had been shut in proved difficult to obtain, and recovery estimates of Bodcaw oil were accordingly qualified as subject to possible revision following 1 year's operation of the cycling unit in the event new information is obtained.

Plant Efficiency and Economics

Estimates of liquid recovery during cycling and liquid and gas recovery during depletion were based on the economics dictating plant design and cycling procedure. The plant is designed to recover 30 per cent of propane, 80 per cent of butanes and 98 per cent of pentanes plus. Cycling will commence simultaneously with initial production from both reservoirs and will continue until the liquid recovery at the plant declines to 0.6 gal. per M.c.f. The field will then be produced to a final pressure of 200 psi., all production being processed in the extraction plant.

From potentiometric model studies, taking into consideration shape of the reservoirs, location of the producing and input wells, and the proposed cycling plan, sweep factors were estimated at 85 and 70 per cent respectively for the "D" and Bodcaw gas-

condensate reservoirs. Calculated recovery by cycling is based on the method developed by Standing, Lindblad, and Parsons[4] and compares closely with recovery estimated from experience in similar operations.

Permeability Variation

Quoting from the report, "A permeability array was made of all permeability measurements on 'D' sand samples plotted on log probability paper, from which it was determined that the average permeability variation of the 'D' sand is 0.60. It is to be noted from this curve that the permeability distribution of the 'D' sand does not follow too well normal probability distribution. For this reason a check of the permeability variation was made by dividing the number of samples into two groups of equal size, the larger permeabilities being in one group and the smaller permeabilities in the other. The group of larger permeabilities showed a variation of 0.39. The group of smaller permeabilities showed a variation of 0.80, giving an average variation of 0.595. In addition, the permeability variation for each well in the 'D' sand was calculated, ranging from 0.47 to 0.80 and having an average of 0.602. A permeability array was made of all permeability measurements on the Bodcaw sand samples, from which it was determined that the average permeability variation of the Bodcaw was 0.75.

Recovery During Cycling

"Following the procedure outlined in the paper by Standing, Lindblad, and Parsons, and using retrograde characteristics and compressibility factors determined from the P.V.T. data, calculation was made of the recovery for cycling and the liquid content of the produced gas as a function of the number of pore volumes of injected gas. The results of these calculations for the 'D' sand reservoir are shown in Fig. 6. Using an 84.2 per cent gross recovery, it was calculated that a net recovery of 82.9 per cent of the original content of the contract liquid in place within the area swept would be obtained by cycling. An economic limit of 0.60 gal. of contract liquid per M.c.f. of produced gas was used. Contract liquid was used rather than plant liquid in this particular case, since calculation showed that if allowance were made for the pressure drop occurring during the cycling period, the same recovery as that shown on Fig. 6 would be obtained when the plant liquid ratio dropped to 0.60 gal. per M.c.f."

Recoveries from the Bodcaw reservoir during cycling were similarly calculated. Results showed that, using a 62.5 per cent gross recovery figure, a net recovery of 61.8 per cent of original contract liquid in place within the swept area would result, with the same economic limit of 0.60 gal. of plant liquid per M.c.f.

Recovery During Depletion

When cycling reaches the economic limit, both reservoirs will then be produced to an estimated final reservoir pressure of 200 psi. Curves for both reservoirs were constructed showing the cumulative contract liquid recoverable from that volume remaining with rich gas in the reservoirs at the end of cycling, plotted versus reservoir pressure. These curves indicated that 64.1 per cent of remaining contract liquid in the "D" sand would be recovered, together with 85.5 per cent of the remaining Bodcaw contract liquid.

Valuation and Equity Determinations

Given the bases listed in Table 1, expected recoveries and values of condensate from 1 acre-ft. of hydrocarbons in place in each reservoir be-

TABLE 2—BENTON UNIT, ESTIMATED ECONOMICALLY-RECOVERABLE RESERVES AND VALUE THEREOF

Producing zone—	Acre-ft. hydrocarbon volume	Est. recovery as of 1-1-46	Est. total recovery as of 1-1-46	Value Acre-ft.	Value Total
"D" Sand:					
Contract gas		6,672 M.c.f./A′	171,254,761 M.c.f.	$266.88	
Contract liquid		576.5 B/A′	14,797,418 bbl.	$720.63	
Total	25,667.68			$987.51	$25,347,091
Bodcaw cond. sand:					
Contract gas		6,854 M.c.f./A′	11,577,434 M.c.f.	$274.16	
Contract liquid		436.87 B/A′	737,939 bbl.	$546.09	
Total	1,689.15			$820.25	$1,385,526
Bodcaw oil sand:					
Contract gas		3,770.5 M.c.f./A′	5,214,111 M.c.f.	$150.82	
Contract liquid:					
Condensate		185.52 B/A′	256,540 bbl.	$231.90	
Oil		578.50 B/A′	800,000 bbl.	$723.13	
Total	1,382.8767			$1,105.85	$1,529,254
Total Bodcaw sand:					
Contract gas & cond.					$1,914,780
Oil					$1,000,000
Total	3,072.0267				
Total all sands:					
Contract gas			188,046,346 M.c.f.		
Contract liquid			16,591,897 bbl.		
Total					$28,261,871

TABLE 3—BENTON UNIT, CALCULATION OF EQUITY PERCENTAGE OF TYPICAL TRACT

Tract No. 1-45

1. **Value of "D" Sand** ($987.51 per acre-ft. hydrocarbon volume)
   a. Productive acre-feet sand = 2,813.77
   b. Average porosity = 18.34 per cent
   c. Average hydrocarbon fraction = 0.893
   d. Acre-feet hydrocarbon volume = a × b × c = 460.83
   e. Value of hydrocarbons in place* = $987.51 × 460.83 = $455,074.23

2. **Value of Bodcaw Condensate Sand** ($820.25 per acre-foot hydrocarbon volume)
   a. Productive acre-feet sand = 1,032.85
   b. Average porosity = 15.96 per cent
   c. Average hydrocarbon fraction = 0.811
   d. Acre-ft. hydrocarbon volume = a × b × c = 133.69
   e. Value of hydrocarbons in place* = $820.25 × 133.69 = $109,659.22

3. **Value of Bodcaw Oil Sand** ($1,105.85 per acre-ft. hydrocarbon volume)
   a. Productive acre-ft. sand = 434.14
   b. Average porosity = 14.40 per cent
   c. Average hydrocarbon fraction = 0.670
   d. Acre-ft. hydrocarbon volume = a × b × c = 41.89
   e. Value of hydrocarbons in place* = $1,105.85 × 41.89 = $46,324.06

4. **Total Value of All Sands**
   a. Value of hydrocarbons in place* = $611,057.51

5. **Equity Percentage**

$$\text{Equity percentage} = 100 \times \frac{\text{Value hydrocarbons in place for tract}}{\text{Value hydrocarbons in place for unit}}$$

$$= 100 \times \frac{\$611,057.51}{\$28,261,870.96} = 2.162127$$

*$1.25 per bbl. for contra liquid and $0.04 per M.c.f. for gas were used in these computations.

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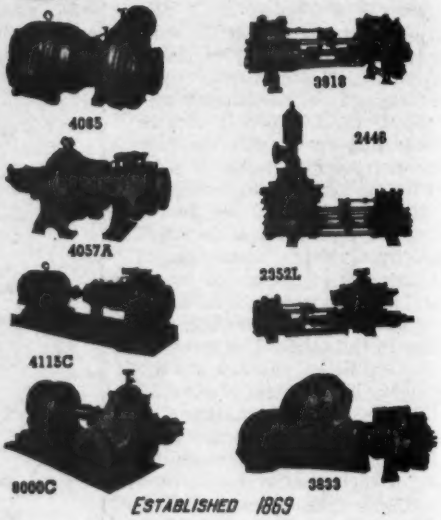

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came a matter of straight calculation, as illustrated for the 'D' sand. Similar estimates of total value of recoverable hydrocarbons for each acre-foot of hydrocarbon volume were made for Bodcaw condensate and oil reservoirs.

These data were used in totaling the volume and value of all recoverable hydrocarbons for the entire unit, as shown in Table 2. Equity percentage in the unit was then calculated for each tract as outlined in Table 3. This first determination of equity percentages fixes the participation of operating lessees in the unit. A second and final determination to be submitted by DeGolyer and MacNaughton 1 year later will result in the permanent equities, to which retroactive adjustment will be made.

The authors gratefully acknowledge permission to publish this paper, as granted by H. W. Manley on behalf of the Unit operator.

References

1. "Determination of the Interstitial-Water Content of Oil and Gas Sand by Laboratory Tests of Core Samples," by J. J. McCullough, F. W. Albaugh, and P. H. Jones, A.P.I. Drilling and Production Practice, 1944.
2. "Estimating Interstitial Water by the Capillary Pressure Method," by O. F. Thornton and D. L. Marshall, TP. 2126, A.I.M.E. Pet. Tech., January 1947.
3. "The Restored State Method for Determining of Oil in Place and Connate Water," by W. A. Bruce and H. J. Welge, The Oil and Gas Journal, July 26, 1947, p. 223.
4. "Calculated Recoveries by Cycling from a Retrograde Reservoir of Variable Permeability," T.P. 220, Petroleum Technology, May 1947.

47 Attending Second Basic Petroleum School

WASHINGTON.—A total of 47 officers of the armed forces are attending the second class of the Basic Petroleum School conducted by Shell Oil Co., Inc., at the Industrial War College here.

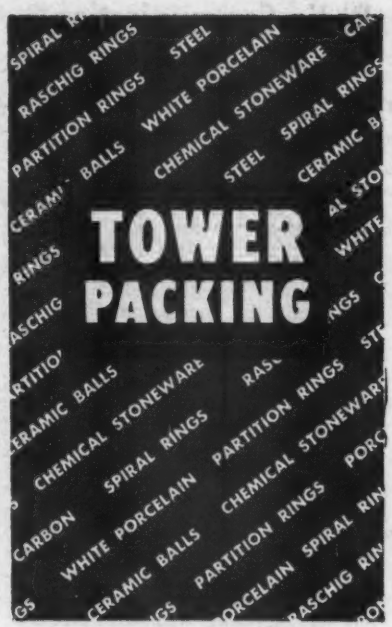
The school, established at the request of the armed forces, is designed to give key military personnel a general knowledge of the manufacture, application, and handling of petroleum products.

Crude-Oil, Natural-Gas Production Up in Canada

Production of both crude oil and natural gas showed gains during December in Canada.

Crude production averaged 24,726 bbl. daily, against 24,354 bbl. during November. Natural-gas production averaged 195,990,000 cu. ft. daily in December against 182,630,000 cu. ft. in November.

Crude production during December 1946 was 19,177 bbl. daily. Natural-gas output during the same month was 172,651,000 cu. ft. daily.



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Radio Communication

(Continued from page 65)

tions atop mesas further to the south showed excellent reception well beyond the normal station ranges.

In general, the range from an elevated antenna to a mobile unit equals in miles, the square root of the antenna height in feet multiplied by four. Range, at constant antenna height, may be extended within certain limits by increasing power; an eight-fold jump in wattage will double the range of a transmitter.

As illustrated, directional beaming now offers an economical alternative to higher towers or more powerful transmitters as means of extending range, in a given direction. This is feasible in many networks where field operations may be located in one general direction from a central station. A directional antenna is completely practical only in a fixed station. It can be installed on derricks, but will not well withstand frequent moving. Directional beaming also affords added range on reception as well as transmission, an advantage which increased power alone does not equal. Further, it offers the operator marked economy. From the examples (title page), the 300-ft. tower costs roughly $2,200 more than the 200-ft. tower, and prices compound rapidly for greater heights. Increasing station power to 250 watts adds range at the cost of about $1,500 but communication is extended only one way, since reception from outlying transmitters is not improved. The same range for both transmission and reception, in a selected direction is possible with the addition of $200 worth of directional equipment to the fixed-station antenna. Directional beaming on both the 200-ft. fixed station and the 130-ft. rig derrick will increase their workable range to 135 miles.

With the entry of F.M. radio into the oil fields, manufacturers and radio service companies are designing portable and mobile units adapted specifically for such uses.

Interference a Problem

Within the ranges for which they are designed, F.M. networks provide continuous communication entirely free of static or interference from natural sources. The only interference arises from man-made static such as X-ray or diathermy equipment, or the signal of other transmitters. The former generally precludes use of receivers in city offices, and wire or very high-frequency automatic radio relays are used to tie such points into fixed stations and networks.

Interference from other transmitters is of three general types: direct, skip, and harmonic. Although it may be aggravated in the future, the direct interference of two networks operating on the same frequency within ordinary range of one another is at present not serious. This is true particularly if both users are industrial, for conducting routine business requires but a small fraction of total time and the "party line" principle works no great hardship on adjacent oil-field networks. In some cases new licensees in the industry have found that the channels assigned them are still in use by police who will be required to change to other channels next year. This interference of users of different classes will be eliminated by January 1, 1950, when the block reallocation plan is completed.

Skip interference is the radio reception of distant stations (1,000 to 5,000 miles) caused by reflection of radio waves from the ionosphere. Skip occurs generally during the daylight hours at frequencies up to 40 megacycles. During violent sunspot activity as experienced during the past 4 months, it is especially strong. Skip hampers communication in southwestern F.M. networks by strong reception from eastern stations during the morning and successively westerly stations as the day progresses. As in direct interference, most of the current trouble occasioned industry users comes from the nearly continuous broadcasting of police and other similar stations. In the future such interference will be from similar intermittent industrial networks and a plan is under way to minimize even that lessened interference by assigning frequencies by zones to reduce, as far as possible, the skip interference among various parts of this country. This plan will not correct skip reception from foreign stations, however.

Interference from some commercial broadcasting stations transmitting on frequencies of one-half and one-third the wave length of the receiving channel is also causing some trouble to industry networks. This type of interference, termed harmonic transmission, can in most cases be corrected or minimized if the interfering station is located in this country and comes under the jurisdiction of FCC. Interference of this type is particularly bad because it is continuous during all waking hours.

Assuming that on completion of FCC's current recataloging of all radio users, oil-industry networks will be assigned enough channels exclusive to their class, it may be expected that common channels or frequencies will serve a large number of licensees satisfactorily. The commission has not yet announced its findings but it is anticipated that the industry will be allocated a fair share of the spectrum space. This is indicated by the proposed Industrial Radio Service an allocation reserved for industry, and including a subdivision termed "petroleum."

Geophysical services will undoubtedly continue to be licensed as a separate class. Pipe lines which have shared with utility companies a so-called power-petroleum block may continue that arrangment. Oil-country service companies which operate fleets of service or supply vehicles may be classed with petroleum, or may be licensed in the land transport section.

Principally concerned in the new setup are all the remaining industry users; drilling contractors, producers, pipe-line contractors, etc., who heretofore have enjoyed no specific standing, but have shared frequencies with the power-petroleum block.

As set up by FCC, the power-petroleum block comprises 17 channels. Subdivision of such blocks is assigned to the Radio Technical Planning Board, which relieves the commission of the detailed decisions affecting individual applications for licenses. Under an interim plan which currently applies, the board authorizes subordinate regional frequency-coordination committees to recommend to the commission, use of alternating channels in the block. This procedure which reduces interference from adjacent channels leaves only nine frequencies for current use. Of the nine, six are set aside for companies in the utility class, including light, power, and gas distributors. The remaining three channels must be shared by oil and gas pipe-line companies not engaging in direct distribution to consumers, and all other industry users. As a result, the three frequencies: 33.18, 33.26, and 33.34 are crowded in active drilling areas and the need for more channels is already being felt in some sections of the Southwest.

In addition to the desire for more space, these "other users" outside the utility-pipe-line class wish to enjoy a more permanent standing with regard to licensing. Originally they were issued provisional licenses, and more recently, experimental licenses. Both of these classes are temporary in nature, and are therefore unsatisfactory for the long-term radio operation on which drilling, production, and other industry activities are surely launched.

Industry Representatives

Early in the history of radio adaptation, the Petroleum Industry Electrical Association ably represented the oil industry before FCC. The recognition given pipe-line users is largely to be credited that association. With the broadening of oil industry use of radio, the American Petroleum Institute recently formed the A.P.I. Central Committee on Radio Facilities, headed by F. W. Littell of Shell Pipe Line Corp., Houston. That committee will continue the task of interpreting the industry's needs to FCC.

Companies or individuals desiring to obtain licenses to operate industrial radio stations must apply to

regional coordination committees, quasiofficial bodies associated with the Radio Technical Planning Board. To those unfamiliar with the procedure of planning networks and obtaining licenses the process may be involved and delayed. It is recommended that prospective radio users contact with either a manufacturer or radio service company which specializes in obtaining licenses and installing and maintaining networks. Even in experienced hands, obtaining a license and installing a network at present requires a period of several months.

Future Radio Uses

In a paper presented before the A.P.I Central Committee on Radio Facilities at the Chicago meeting, Chairman Littell outlined present and future uses of radio. Of particular interest were some of the prospective uses he mentioned. Facsimile transmission, now possible, might be used to expedite well completions through rapid transmission of electrical logs and other well records to field offices and company headquarters. Meter readings, maps, and drawings might presumably be transmitted by radio with advantage in the future.

Microradio relay links, believed to be just around the corner, should find advantageous use on pipe lines and field operations, greatly extending range along specific routes and offering continuous communications where wire might fail. Radio communication between pipe-line patrol planes and stations along right-of-way is now technically possible and is being considered by some pipeline companies. Short range "walkie talkie" sets offer advantages in pipeline construction, particularly at river crossings. The same adaptation might be used successfully in switching and gaging on large tank farms.

Radio remote control of pumps or valves located at isolated wells, tank batteries, or gathering stations is another possibility. Warning systems connecting central points with remote producing outposts might also prove feasible. In the marketing division, dispatching networks linking tank-truck fleets to bulk stations offer further possibilities for radio adaptation. Finally, in the refining division, very high-frequency radio waves and their effect on the conversion of petroleum are now being investigated in laboratories.

Progress in radio technology offers hope for some future relief of the crowded frequencies anticipated from the tremendous current demand for space on the spectrum. The use of very high frequencies in combination with directional beaming or automatic relay may open new channels. Another possibility is the narrowing of presently used channels from 40 kilocycles to a width of 20 kilocycles, by means of more precise transmission equipment. This probability alone will double available channels.

PLANT PRACTICES

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Testing for Heat-Exchanger-Tube Leaks

MADE in two separate parts the testing tool operates with air, which is delivered into the tube through the part shown positioned in the upper half of the tube sheet in the photo at left. The other part of the tool, shown positioned in the lower portion of the tube sheet, serves merely to plug up the open end of the tube being tested.

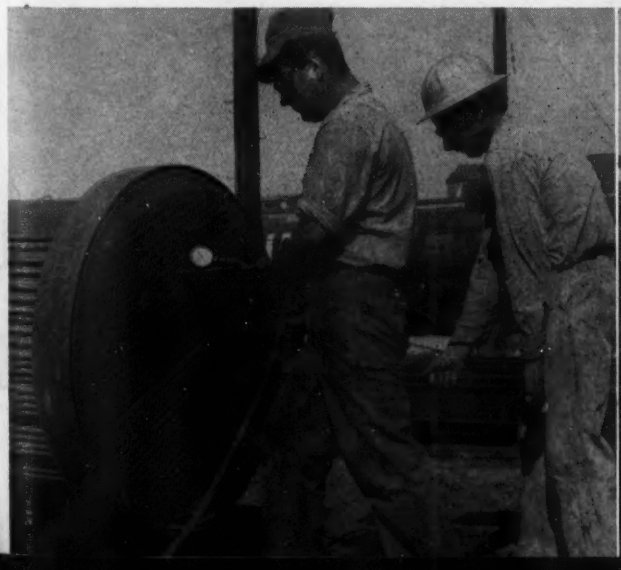
Air up to 100 psi. is admitted into the tube by opening a hand-operated lever valve on the tool. After some predetermined pressure has been built up in the tube the valve is closed and the pressure gage attached to tool is observed for pressure drop.

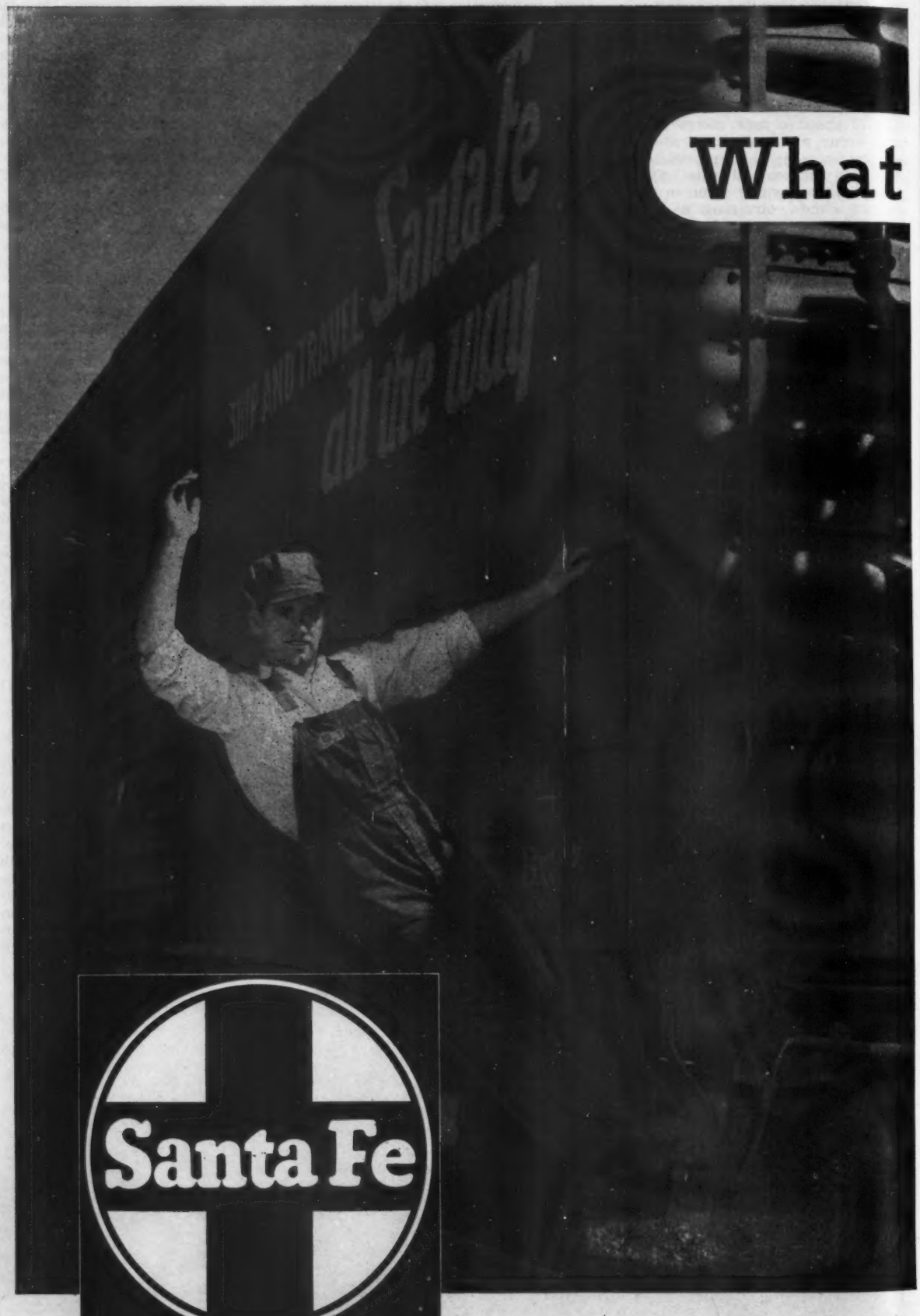
Ordinary pipe, a pressure gage, and lever valve are used in constructing the tool for admitting air into the tube. To seal the tool tip against leaking at the tube end, an ordinary rubber plug similar to the type employed in laboratories, is placed over the tool's tip end. End of the plug that is placed into the tube is made conical, with its taper relatively short and with its maximum and minimum diameters sufficient to accommodate a large number of tube sizes.

The tool used for plugging operations is equipped with a similar plug except that it is without a hole in its center. Ordinary ¼-in. rod is used to make the plugging tool which has a disk with a curved surface attached to its end opposite the rubber plug. This disk is for providing the operator with a hand-pressure surface for maintaining the tool in position when air pressure is applied to the tube. Air pressure and time required to detect leaks vary according to several factors common to tests of this type. Consequently schedules should be worked out for each set of conditions.

Tube-Pulling Clamp

AN ordinary cable clamp such as employed in constructing power and other types of electrical transmission lines speeds up the operation of removing tubes from exchanger bundles. A small winch, equipped with an air motor, supplies the power for the operation, seen in the photo at right. Ordinary methods are employed for placing the tube into position for pulling. Under normal conditions means for securing the bundle against the pull of the winch are not required.

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Cracking, Reforming Pennsylvania Stocks

(Continued from page 74)

od unleaded. It should be mentioned that even higher research method octane can be obtained by operating the fluid reactor at higher temperatures if necessary.

The cycle oil produced from the 40° A.P.I. gravity 624° F. e.p. charge stock in this operation had an A.P.I. gravity of 35 and a boiling range of 462°-630° F. This observation that there is little loss in A.P.I. gravity and little change in boiling range when a Pennsylvania gas oil is catalytically cracked, even at high conversion level, is explained by the fact that Pennsylvania gas oil contains about 95 per cent paraffin hydrocarbons and when it is cracked catalytically, the paraffin content of the cycle stock is still high. In the case of the Mid-Continent gas oil which contains perhaps 30 per cent naphthenes and aromatics, the cycle stock from catalytic cracking is much more refractory and contains a higher concentration of aromatics which do not burn as well as paraffins in pot-type burners. For example, a 32° A.P.I. gravity Mid-Continent gas oil cracked at 90 per cent conversion and 2 to 1 recycle ratio would produce a 23.5° A.P.I. cycle stock having a characterization factor of 10.9, which indicates a rather high aromatic-naphthene concentration.

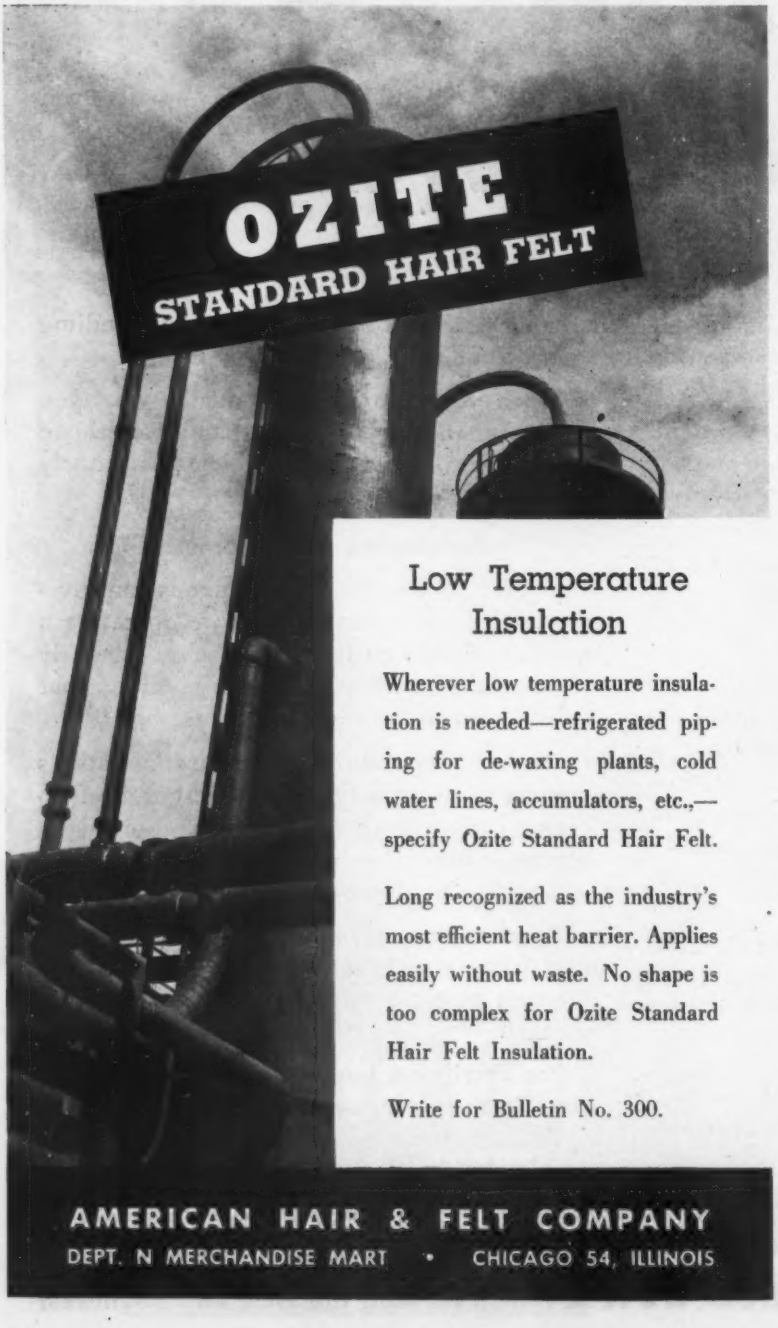
TABLE 5—PRODUCTS PROPERTIES—U.O.P. FLUID CATALYTIC CRACKING PENNSYLVANIA GAS OIL

Debutanized 400° F. e.p. gasoline:	
Gravity, °A.P.I.	59.0
Total sulfur, wt. per cent	0.01
Mercaptan sulfur, wt. per cent	0.001
Reid vapor pressure, lb.	6
Octane numbers:	
F-2 motor clear	79.0
+3 cc. TEL/gal.	85.0
F-1 research clear	87.5
+3 cc. TEL/gal.	94.5
100 ml. distillation:	
I.b.p., °F.	110
10 per cent	139
30 per cent	173
50 per cent	222
70 per cent	286
90 per cent	382
End point, °F.	408
Cycle stock:	
Gravity, °A.P.I.	35.0
Universal viscosity at 100° F., sec.	36
I.b.p., °F.	462
End point, °F.	630

Comparison of Properties

Although the charge stock to the thermal cracking operation, summarized in Tables 2 and 3, was slightly lower in gravity than that used in the catalytic cracking tests, it is of interest to compare the properties of the fuel oils produced in the two cases. The fuel oil from thermal cracking had an A.P.I. gravity of 11.1 and a Universal viscosity of 430 seconds at 100° F., as compared with the 35° A.P.I., 36 S.S.U. at 100° F. viscosity catalytic cycle stock. It is apparent, therefore, that in addition to increasing over-all octane number the catalytic cracking operation increases the distillate fuel yields obtainable from a barrel of Pennsylvania crude over that obtainable when thermal cracking is employed. By the addition of a small amount of kerosine or light gas oil to reduce the pour point from approximately 20° F. to an acceptable value and to lower the 10 per cent point to 440° F., the catalytically cracked Pennsylvania cycle stock will meet No. 2 distillation fuel specifications, whereas the thermally cracked residuum, which is produced largely by polymerization reactions at high pressure, can only be sold as No. 6 fuel.

Recent laboratory diesel engine tests have been conducted on a light Pennsylvania catalytic cycle stock produced at approximately 50 per cent conversion. Diesel-engine tests were made at high output for comparison on this and three different fuels (Wyoming catalytic cycle stock, California, and Mid-Continent straightrun gas oils). Although the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samples of fuel varied in gravity, sulfur content, and cetane number to a marked degree, there was no appreciable difference found between the fuels as far as their effect on engine operation was concerned. The test data for the Pennsylvania catalytic cycle stock was in nearly all instances, as good as or better than any of the other three fuels tested.

BOOKS

A NATIONAL POLICY FOR THE OIL INDUSTRY. By Eugene V. Rostow. Published by Yale University Press, New Haven, Conn. 173 pp. $2.50.

This study purports to investigate the forces which determine the level of prices and output in the petroleum industry, to examine the functioning of the system of law which defines public policy toward that industry, and to consider alternative courses of action for the industry which might be pursued in the national interest. Moreover, it attempts to analyze the petroleum industry for its own sake, and to weigh in this instance the practical applicability of more general hypotheses about desirable national policy for the organization of industry The study considers in detail proposals for reorganizing the oil industry under the antitrust laws, or under special petroleum legislation, in the interest of achieving the social, economic, and political advantages of more competition.

REVIEWS OF PETROLEUM TECHNOLOGY 1941-45. By F. H. Garner, E. B. Evans, and George Sell. Published by The Institute of Petroleum, Manson House, 26, Portland Place, London, W. 1, England. 535 pp. 21 s.

Prior to the war the institute published an annual volume, "Reviews of Petroleum Technology," the last such being Volume 6, which was issued in 1941 and covered the year 1940. During the war much progress was made in every branch of the petroleum industry, and petroleum-research organizations were devoting their total energies to manufacturing numerous special products to meet the exigencies of war. The results of these efforts are scattered throughout the scientific, technical, and trade press of the world. The present volume collects, collates, and reviews references to over 3,000 articles which appeared during 1941 to 1945.

Reference is made to nearly 3,500 original articles in published literature. Some subjects have had to be omitted from the present volume notably gasoline and other light distillates and furnace-fuel oils, but these, together with other subjects, will be included in the next volume.

SURFACE CHEMISTRY FOR INDUSTRIAL RESEARCH. By J. J. Bikerman. Published by Academic Press, Inc., 125 East Twenty-Third Street, New York. 464 pp. $8.

This volume is an exposition, adapted to industrial research, of the fundamentals of surface science. Compared with textbooks on pure surface chemistry, it contains less theory, and the theory presented is of the least hypothetical kind. The book emphasizes the importance of several factors which are often overlooked, such as roughness of solid surfaces and their chemical and physical homogeneity, the miscibility of "immiscible" liquids, the sensitivity of all sorts of physical quantities to common impurities, and so on. The book differs from some volumes on applied chemistry of surfaces or colloids in that it does not set out to teach the procedures of any industry. It is written for people who know what is being done in their plant but want to know why it is done in a certain way and whether it can be done better.

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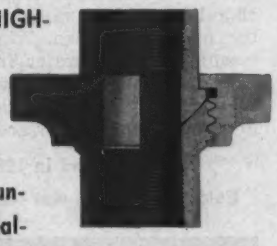

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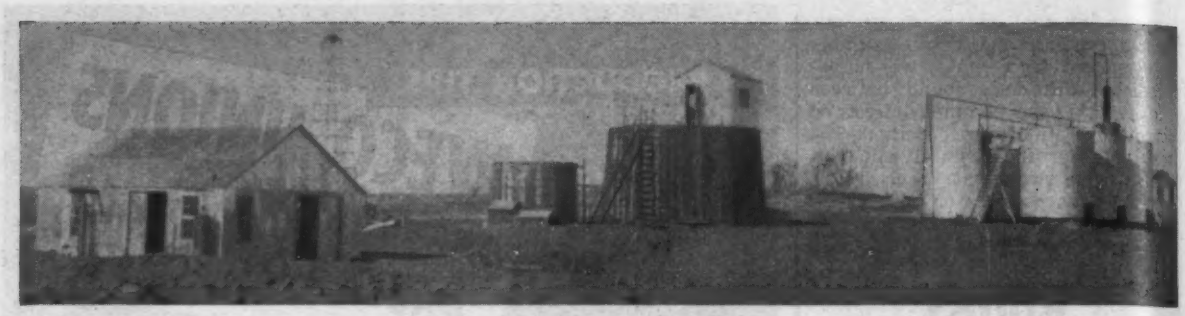


Injection and treating plant: Steel building at left houses injection pump and gravity filters. Wooden tank in center of picture is 1,600-bbl. storage tank with chemical treating equipment contained in the small house on top of the tank. Patterson Block central tank battery is at right of picture

Cities Service Water-Flood Plant Nears Completion

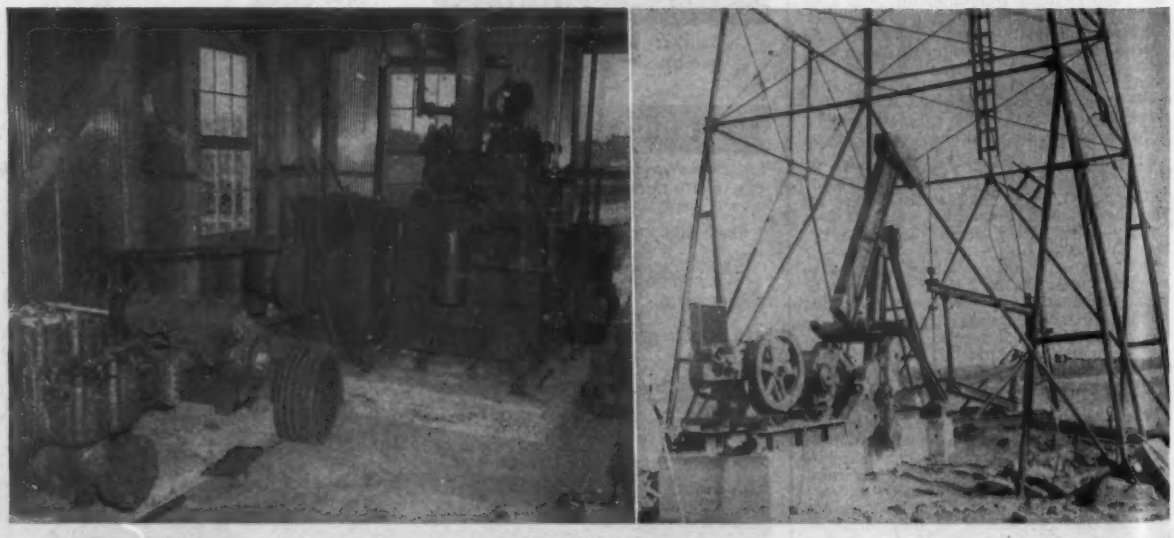
by Leigh S. McCaslin

CONSTRUCTION is nearing the completion stage in eastern Kansas at a new Cities Service Oil Co. water-flood plant. The project is located on the Patterson block (centered in Section 36-23s-11e) of the Hamilton pool 15 miles northeast of the town of Eureka. When work is completed, fresh water from Willow Creek, 1½ miles distant, will be treated and then used as injection water to augment the subsurface supply.

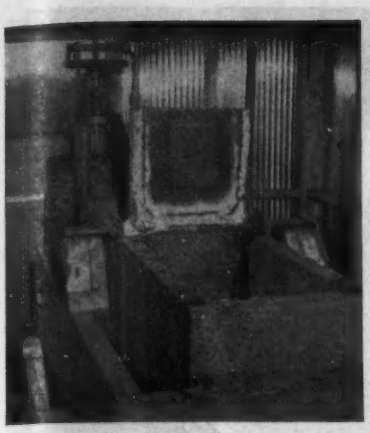
Developed in 1929

Patterson block was developed in 1929 and was produced by primary methods until 1940 when gas repressuring was instituted. Repressuring continued until the fall of 1946 when the present water flood got under way. The block contains 12 input and 30 producing wells in the Bartlesville sand at 1,800 ft. depth. Up until the present, the water source has been Douglas sand water produced from supply wells on the property. However, the quantities obtained have proven too small for the program desired, and hence the present construction was designed in order to

M. M. Hardin, Madison district superintendent for Cities Service, discusses the project with L. R. Owens, head roustabout for the Patterson Block



Left: Installation work under way on 4-by-6-in. duplex pump and 8¼-by-9-in. gas engine which will pump water from the 1,600-bbl. storage tank to the input wells. Right: New pumping unit in position ready to replace the pumping jack in anticipation of increased production due to water flood

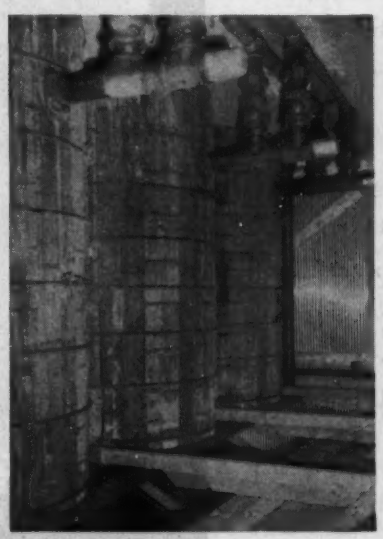


This field-fabricated chemical-treating apparatus introduces chemicals into the flood water

obtain supplementary water supply.

Water-treating unit.—The field-fabricated chemical treating setup shown above is in the house atop the wood storage tank and is designed to proportionally introduce the chemicals, and to use the energy of the incoming stream to actuate the mechanism. All water used for injection purposes—whether Willow Creek, Douglas sand, or produced—can be routed through this treater if necessary. Trough-like arrangement in foreground is on a pivot and divided into two sections, with a baffle plate in the middle extending above the trough. Incoming water hits this trough, first on one side and then on the other, dumping as the half trough becomes full. The dumping causes the long bar attached to the baffle plate to move a notched wheel a part revolution. This wheel is screwed on a long threaded rod. Turning of the wheel causes the rod to be forced down. A solid airtight drum is fastened to the bottom end of the rod and immersed in another drum which contains the treating chemical.

The chemical drum has an overflow on the side leading to the incoming water. As the airtight drum moves downward, the treating chemical is forced out the overflow and into the water to be treated. This water then goes through about 20 ft. of trough which contains baffles spaced at about 1-ft. intervals. After this treatment, the water goes into the storage tank below and is ready for filtration.



Battery of gravity filters which are contained in the water plant building

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SUMMARY OF TECHNICAL AND PATENT ASSETS. Published by Phillips Petroleum Co., Bartlesville, Okla. 223 pp.

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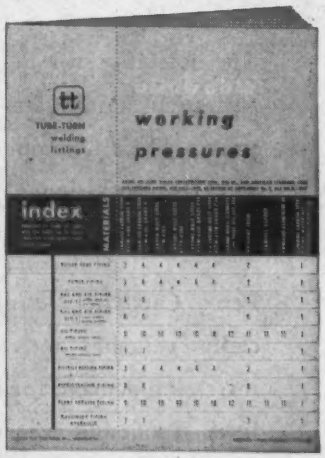

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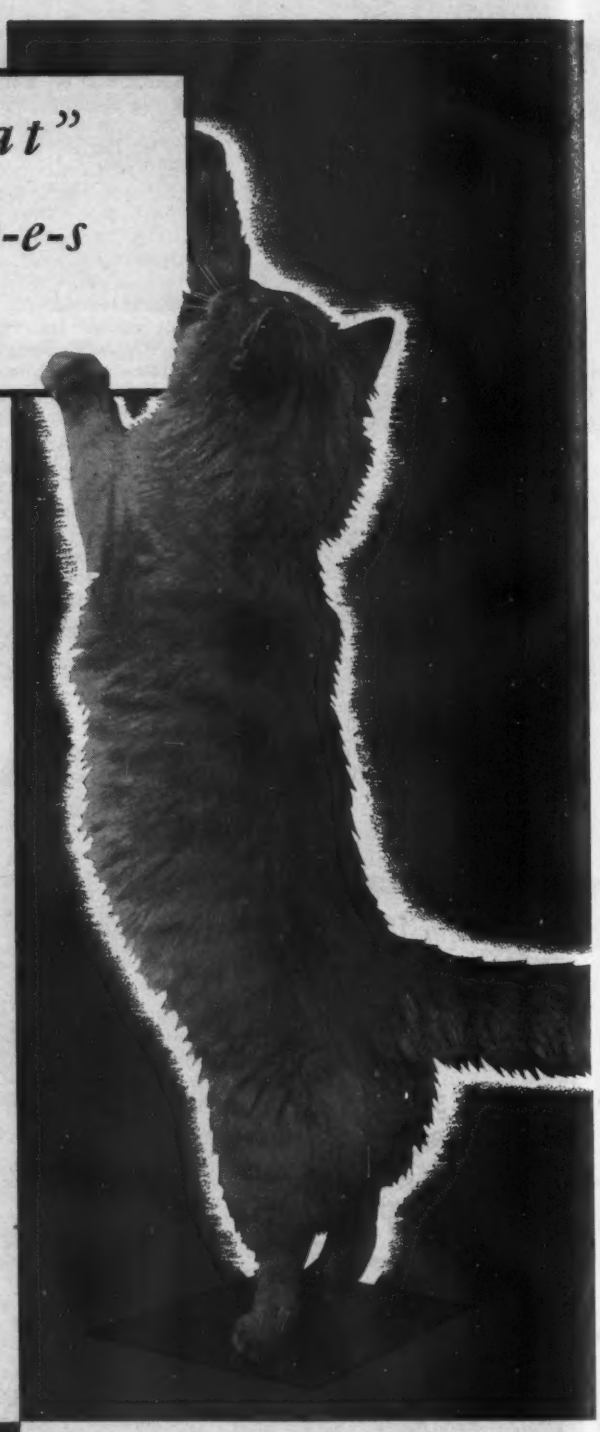

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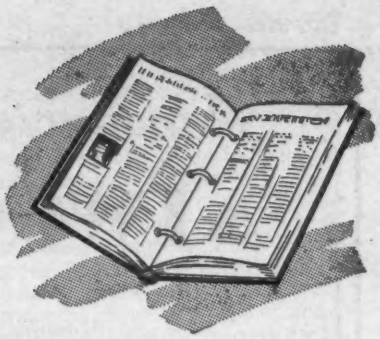
The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL



Pressure Drop in Vapor Lines

THE pressure drops tabulated here are based on charts published in The Oil and Gas Journal of March 30, 1944, page 90, and an equation in the issue of November 4, 1944, page 73. Fundamentally they are based on Fanning's fundamental friction-loss equation and the use of a "friction factor" based on the viscosity (Refiner's Notebook No. 183, February 12, page 109, and No. 185, February 26, page 147) and the specific gravity of the vapors.

The gasoline data (300° F. and 18 psia.) shown on this page may be used as standard data from which the pressure drop for other materials or other conditions of temperature or pressure may be estimated. The factor by which the standard gasoline data are divided is:

$$\text{Divisor} = 0.4\ MP/T$$

in which "M" is the molecular weight; "P" is the absolute pressure, psia.; and "T" is the absolute temperature (°F. plus 460).

The tabulation is based on 100 ft. equivalent length of vapor line. The equivalent length of the elbows, tees, etc., used in vapor lines were presented in Refiner's Notebook No. 176, December 27, 1947, page 285.

Example.—The gasoline, reflux, and steam from a topping tower amount to 65,000 lb. per hour. According to the tabulation on this page, the friction loss for a 12-in. line will be about 0.37 psi. for a 100-ft. line. The line actually travels vertically for 40 ft., horizontally for 62 ft., and it contains six medium-sweep 90° turns. According to Refiner's Notebook No. 176, the equivalent length of the six turns is 127 ft. and hence the total length is 229 ft. and the pressure drop will be:

$$0.37 \times \frac{229}{100} = 0.85 \text{ psi.}$$

APPROXIMATE PRESSURE DROP IN 100 (EQUIVALENT) FEET OF VAPOR LINE, PSI.

Pounds per hour product, reflux, and steam or gas	Gasoline at 300° F. and 4 psig.						Cracked distillate at 440° F. and 56 psig.					
	4"	6"	8"	10"	12"	16"	4"	6"	8"	10"	12"	16"
2,000	0.10	....	....	....	....	....	0.03	....	....	....	....	....
3,000	0.20	....	....	....	....	....	0.06	....	....	....	....	....
4,000	0.36	....	....	....	....	....	0.11	....	....	....	....	....
5,000	0.56	....	....	....	....	....	0.17	....	....	....	....	....
6,000	0.80	0.10	....	....	....	....	0.24	0.03	....	....	....	....
7,000	1.05	0.15	....	....	....	....	0.32	0.05	....	....	....	....
8,000	1.40	0.20	....	....	....	....	0.43	0.06	....	....	....	....
9,000	1.75	0.23	....	....	....	....	0.53	0.07	....	....	....	....
10,000	2.10	0.29	0.08	....	....	....	0.64	0.09	0.02	....	....	....
20,000	8.30	1.02	0.29	0.10	....	....	2.53	0.31	0.09	0.03	....	....
30,000	....	2.30	0.62	0.20	0.09	....	....	0.70	0.19	0.06	0.03	....
40,000	....	4.00	1.07	0.36	0.14	....	....	1.22	0.33	0.11	0.04	....
50,000	....	6.20	1.65	0.56	0.23	....	....	1.89	0.50	0.17	0.07	....
60,000	....	8.70	2.30	0.80	0.31	0.09	....	2.66	0.70	0.24	0.09	0.03
70,000	....	....	3.15	1.05	0.43	0.11	....	....	0.96	0.32	0.13	0.03
80,000	....	....	4.10	1.40	0.57	0.14	....	....	1.25	0.43	0.17	0.04
90,000	....	....	5.20	1.75	0.72	0.18	....	....	1.59	0.53	0.22	0.05
100,000	....	....	6.50	2.10	0.88	0.21	....	....	1.98	0.64	0.27	0.06
200,000	....	....	....	8.00	3.20	0.80	....	....	....	2.44	0.97	0.24
300,000	....	....	....	....	7.30	1.70	....	....	....	....	2.23	0.52
400,000	....	....	....	....	....	3.00	....	....	....	....	....	0.92
500,000	....	....	....	....	....	4.60	....	....	....	....	....	1.40
600,000	....	....	....	....	....	6.40	....	....	....	....	....	1.95
700,000	....	....	....	....	....	8.60	....	....	....	....	....	2.62

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Resume of Reservoir Forces And Controlling Factors

FOR a proper understanding of reservoir performance, it is necessary to have a knowledge of the forces which control or enter into the behavior of fluids within reservoirs. Once the basic forces have been enumerated, individual behaviors can be better analyzed in the light of the relative importance of each of the forces and correlated thereby.

It is generally accepted that three primary forces are to be considered. There are (1) forces of viscous resistance, (2) gravity, and (3) forces of capillary action. If there are other primary forces operative, due to any of the earth's natural force fields, or due to producing practices imposed, they are not at present defined or recognized.

The viscous resistance of fluids is a commonly understood term. These forces come into play in direct proportion to the pressure differentials present within a reservoir and are a function of the type of reservoir and type of fluid considered. They are retarding and not producing forces. Work must be performed against them in producing fluid from a reservoir.

Gravity can be considered as a driving force so far as reservoir performance is concerned. Its likeliest manifestations are through the segregation of fluids within the reservoir and through drainage down structure.

Forces of Capillary Action

Forces of capillary action are probably least understood of the group. These are the forces which allow a reservoir to retain an amount of connate water within the oil zone against the tendency of gravity to remove it to the bottom of the reservoir, and which act in a large measure to retain oil within the reservoir pore space against a producing differential. These forces are at times called surface forces and are in direct proportion to the amount of surface area involved. Since the surface area of reservoir material is relatively large, these forces assume importance. Capillary forces must most generally be considered as retaining forces so far as petroleum production is concerned but could under some situations act as expulsive forces.

The action of these three groups of forces to varying degrees give rise to the three basic engineering quantities which it is desirable to evaluate. They control (1) the original distribution of fluids within the reservoir, (2) the simultaneous movement of fluids through a reservoir, and (3) the displacement of one fluid by another within the reservoir. The first of these quantities can be described in terms of capillary forces and gravity since the original distribution is a static condition. The other two quantities can be described only in terms of all three groups of forces.

Primary Forces Active

During the performance of any reservoir all of these primary forces are active. It is an erroneous concept to consider that one is acting to the exclusion of the others. It is true that at times one group of forces may become dominent to the extent that others become insignificant. This is commonly assumed when gravity is discussed as a driving force. The effects of gravity are, however, always present in any reservoir. Viscous forces become most dominant at high rates of fluid movement and thus they may virtually overshadow effects of gravity. Capillary forces require time for adjustment of equilibrium. Therefore, they should be operative to a higher degree of effectiveness at low rates of fluid movement. At high rates of fluid movement their action may be negligible.

It is apparent, therefore, that the relative play enjoyed by each of the three groups of forces in any given case is dependent upon a number of factors. These factors could be given as a list of those variables necessary to consider in analyzing the behavior of a reservoir. For convenience these variables can be grouped naturally as follows: (1) the nature of the reservoir, including structure, internal pore arrangement, and chemical nature of the surface; (2) the nature and the relative amounts of the reservoir fluids; (3) the conditions of pressure and temperature, and (4) the operating conditions imposed upon the reservoir.

Must Consider Separate Quantities

Within each of these groups, moreover, it is necessary to consider many separate quantities. For example, the nature of reservoir fluids must consider gas solubility, viscosity, compressibility, density, etc. In any given reservoir when discovered the variables listed under (1), (2), and (3) are already fixed. It is only those variables in the fourth group which permit the operator any freedom in fixing himself the manner of performance of the reservoir. However, the relative role of each factor can be determined to a certain extent by operating procedure, and it is necessary to evaluate the role of all factors to know to what extent the effect of each is changed by a change in operating procedure.

In a given reservoir the values which are placed upon each of the variables involved suffice when taken together to define the magnitude or relative importance of each of the primary forces first enumerated. This in turn will evaluate the distribution, simultaneous movement, and displacement of fluids within the reservoir, the effect of which will be manifest in those quantities which are taken as criteria of reservoir performance, namely, rates of production, pressure decline, gas-oil ratios, water-oil ratios, and the ultimate recovery. At the present time we can follow this sequence of causes and effects through only partly because we understand how only a few of the variables enter in a quantitative sense. We understand most of them only in a qualitative manner.

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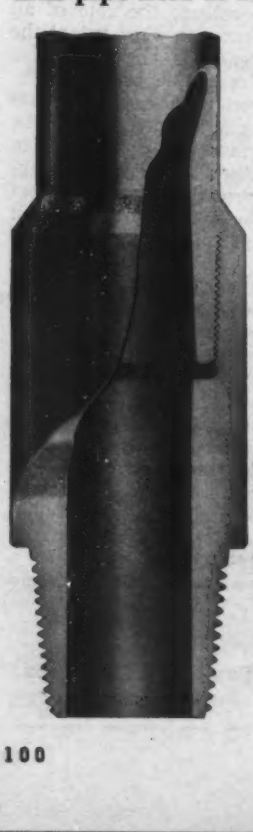

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Among the

Drilling Contractors

Deardorf Drilling Corp. Formed in Oklahoma City

Deardorf Drilling Corp. has been organized in Oklahoma City under a Delaware charter with capitalization of $100,000, according to an announcement by B. C Deardorf, president.

Officers of the new firm include William A. Dutton, vice president and director, and Harriette R. Brooks, secretary-treasurer and also a director. Dutton joined Deardorf recently after having been with Martin & Manning, Inc., as a superintendent for 7 years.

Company has one rig at present and is awaiting delivery of another. It contemplates having four rigs running by spring. Drilling for the present will be confined to Deardorf Oil Co. operations which are concentrated in east central Oklahoma currently.

Frazier to Head Houston Chapter of A. A. O. D. C.

HOUSTON.—Jack W. Frazier, Houston drilling contractor and independent oil operator, has been elected chairman of the Houston chapter of the American Association of Oilwell Drilling Contractors.

He succeeds E. O. Buck, formerly southern region manager, Rowan Drilling Co., and now head of the oil-loan department of National Bank of Commerce. Other new officers of the Houston group are John B. Holmes, Holmes Drilling Co., vice chairman, and C. H. Phifer, L. D. Cain Drilling Co., secretary-treasurer.

Frazier in the next few weeks is expected to set up a committee organization to handle arrangements for the annual national convention of the A.A.O.D.C. which will be held in Houston next October.

D & M Drilling Co., Inc., Pampa, Tex., has been issued a permit to do business in Oklahoma. Concern has $60,000 capital paid on in Oklahoma and registered agent is L. D. Abney, 2708½ N. McKinley, Oklahoma City.

Mallard Drilling Co., Wichita, and Westgate-Greenland Oil Co. have brought in a producer 1 mile south of the Hoffsommer pool, McPherson County, Kansas, which was opened last August by same operators. Newest discovery is 1 Burk, NW NE SE 7-18s-1w, which tested for 160 bbl. or better with production from Mississippi chat at 2,736 ft.

Parker Drilling Co., Tulsa, is rigging up for Coastal Petroleum Co. 1 Wright, wildcat in 7-30s-17e, 6 miles north of St. Petersburg, near Tampa Bay, Pinellas County, Florida.

Deepest well ever drilled by a contracting firm and deepest test ever drilled in California are records established by Rocky Mountain Drilling Co. in going to a total depth of 17,696 ft. at the well pictured here. Known as the 1 Maxwell, 23-2n-23w, Ventura County, the venture was a deep wildcat test drilled for Standard Oil Co. of California. Operators were striving for a world's depth record when stuck drill pipe forced abandonment of the well only 127 ft. short of such a depth. See "Running High" on the next page for information on the growth and activities of Rocky Mountain

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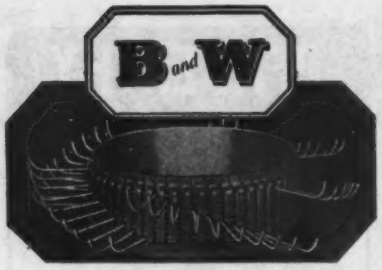

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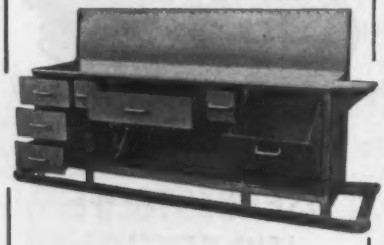

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HOUSTON 7, TEXAS

RUNNING High

Rocky Mountain Drilling Co. Los Angeles

Growth.—Starting out with three rotary rigs, Rocky Mountain Drilling Co. was organized in Wyoming in 1931. In 1939 offices were moved to Los Angeles and operations expanded to cover California, Washington, and Wyoming. Currently, the company has its headquarters at Los Angeles and maintains a tool yard at Bakersfield. Rocky Mountain specializes in deep drilling, and has established deep-drilling records both in California and Wyoming.

Rigs.—Seventeen rotary rigs, all designed for deep drilling. Smallest rig is capable of reaching 7,500 ft. and larger rigs are capable of reaching extreme depths.

Personnel.—Dorsey E. Straitiff, president; L. A. Whipple, Jr., vice president; D. N. Lewis, secretary-treasurer; and Frank Gibson, drilling superintendent, all in the Los Angeles office.

Sidelights.—Company recently has concluded operations at Standard Oil Co. of California 1 Maxwell, wildcat in Ventura County, California, at a total depth of 17,696 ft. This well established three records: Deepest ever drilled by a contract drilling organization, deepest ever drilled with a power rig, and deepest drilled to date in California. Another California record was established in 1940 when the firm completed Standard of California 4 Mushrush, Wasco field, as an oil producer at a total depth of 13,135 ft., which at the time was the deepest hole ever drilled under bottom-hole contract. Late last year Rocky Mountain completed 3 Unit at Church Buttes, Wyoming, for Mountain Fuel Supply Co., at 13,063 ft. total depth. This is not only the deepest well ever drilled in Wyoming and the Rocky Mountain region, but the area's deepest producing well.

Owens & Lamb Drilling Co. will drill W. B. Hinton 2 Maude Baker, in Tri-Cities field of Henderson County, East Texas. Location is in Y'Barbo Survey. Same company will also drill an outpost test southwest of Tri-Cities, and 1½ miles northwest of Cross Roads, to be known as Alexander et al 1 D'Arman, in Cordova Survey.

Hoyt Drilling Co., Long Beach, has received contract for Amerada Petroleum Corp. 37-7 Farnsworth, West Newport field, California.

Canadian Drilling Co. has been organized by J. L. (Whitey) Wilson and Associates with headquarters at Lloydminster, Sask., and will operate largely in Lloydminster and Leduc fields.

McCall & Cline, Mount Carmel, Ill., will drill a Gibson County, Indiana, test, their 1 Roy Woods, NE SE SW 23-2s-10w.

Wayne H. Gale, Westfield, Ind., has received contract for Frederick B. Cline 19 Elwood Tomlinson, 1,050-ft. test in SE NE 19-19n-4e, Hamilton County, Indiana.

Gilliam Drilling Co. has brought in an estimated 500-bbl. well at its wildcat, 1 Seitz, NW NW SE 23-1s-13w, Wabash County, Illinois. Production is from Cypress sand at 2,280-88 ft.

Pioneer Drilling Co., recently organized by United States interests with head office at Winnipeg, Manitoba, has contract to handle drilling operations to be jointly conducted by Waywasecapow Oils and Lizard Point Oil Co., both of Winnipeg, on holdings of 76,000 acres in western Manitoba.

Sam Malis, Mt. Carmel, Ill., has contracted for a 2,300-ft. test, the Harley A. Huskey 1 Wilfred Schmitt, NW NW NW 33-4s-10w, Vanderburgh County, Indiana.

Standco

NO-SMOKE

STANDCO BRAKE LINING

For the easiest brake known. It feeds off evenly. Standco never scores brake rims. See pages 3608-3613, Composite Catalog.

Standco Brake Lining Co.

HOUSTON

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are a necessary function for proper accounting for each lease. Tax returns as well as profit depend to a great extent on the proper transfer of charges. Four Kraftbilt transfer forms are carried in stock. Write for samples and low prices.

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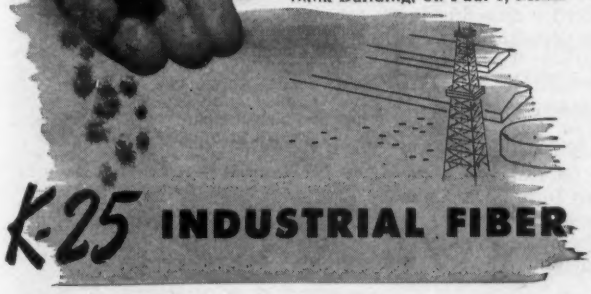
be ready to deal with

cavernous formations

When large crevices cause a loss of mud, be prepared with K-25 Fiber. These treated fibers are a valuable aid because they form a dense, felted mat of high sealing efficiency. Rigid quality control in the manufacture of K-25 Fiber assures you a uniform product with stable characteristics. K-25 mixes easily with mud—does not rot or disintegrate—stays in suspension until deposited. Find out why so many engineers recommend K-25 for dealing with lost circulation—write Wood Conversion Company, Dept. 204-38 First National Bank Building, St. Paul 1, Minn.



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WALL MAPS?

PIPE LINE WALL MAP OF THE U. S.— 31 x 48 inches, printed in four colors. Shows all the crude oil and products trunk lines in the U. S. with the names of the owners given in each case. Published September, 1946. Price $1.00.

JOURNAL GUIDE TO WORLD OIL— 36 x 48 inches, printed in four colors. A handsomely illustrated map of the world, showing the various oil producing areas, refineries, pipe line and tanker routes, surrounded by enlarged maps of the major oil producing countries with important facts and figures. Published January, 1947. Price $1.50.

JOURNAL GUIDE TO GULF COAST OIL— A handsome 36 x 48 in. wall map printed in five colors. Shows locations of all oil and gas fields, all refineries, the inland waterways system, and other facilities. Carries a complete list of the Gulf Coast oil and gas fields, a list of refineries by towns, a list of the natural gasoline and cycling plants by fields, and a list of terminals. Published May 31, 1947. Price $1.50.

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THE OIL AND GAS JOURNAL

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in a small space

Goulds "Close-Cupld" Pumps are the answer to the operating man's problem—single shaft eliminates coupling and maintains perfect alignment, vibration free, no bedplate needed. All you do is to set this compact unit in place, connect it up and turn on the current. 17 sizes to select from—capacities up to 2000 G.P.M., heads up to 400, depending on capacity.

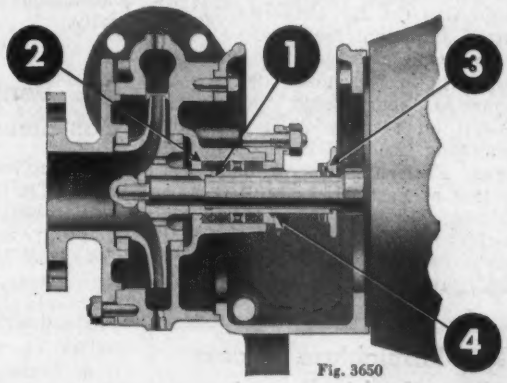

Fig. 3650

THESE IMPORTANT "CLOSE-CUPLD" FEATURES MEAN BETTER OPERATION

1. Shaft sleeve covers full length of shaft . . . compression seals between shaft sleeve and impeller hub and sleeve and shoulder on shaft completely protect shaft from liquid damage. Unlike most pumps, shaft sleeve is free to expand or contract with temperature changes—prevents buckling and distortion.
2. Machined stuffing box designed for die-formed, semi-metallic packing or mechanical seal *without* necessity of making machining changes . . . gives you operating flexibility.
3. Liquid deflector, mounted on end of shaft sleeve prevents leakage of liquid into motor bearing . . . is drilled and tapped so that it can be used to prevent shaft rotation while removing or tightening impeller nut; also, to remove sleeve . . . saves time.
4. New split gland simplifies repacking of stuffing box, when necessary, another time saver.

Send for your copy of Bulletin 710.1 today. You will find the data complete enough to enable you to select the proper pump and motor . . . make layouts and check all materials.

For heavy duty—general purpose pumping—

THE GOULDS "SUPPORT-HEAD" CENTRIFUGAL PUMP

Standardization of parts . . . extra heavy construction . . . 23 sizes . . . capacities up to 3000 G.P.M. are some of the reasons why so many companies standardize on Goulds "Support-Head" Pumps. Send for Bulletin 715.1.

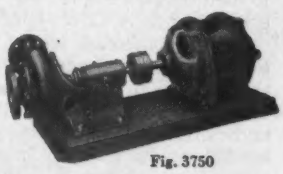

Fig. 3750

GOULDS PUMPS, INC.
SENECA FALLS, N. Y.
the PUMP FOR the JOB

NATURAL GAS

East Ohio Decision Confirmed by FPC

Initial decision of the presiding examiner has been allowed to become effective by the Federal Power Commission on the application of East Ohio Gas Co. for authority to construct additional facilities.

East Ohio was granted temporary authority in September 1947 for the proposed construction, which included an 84-mile, 20-in. pipe line extending from a connection with Texas Eastern Transmission Corp.'s system at East Ohio's Mullett Farm valve station to its Gross Farm valve station near Canton, Ohio. Cost of the project was estimated at $3,200,000.

Gas-Manufacture Process Is Described in Report

A 42-page mimeographed report on "The Wintershall - Schmalfeldt Process for the Manufacture of Synthesis Gas at Lutzkendorf" is being distributed by the Office of Technical Services of the Department of Commerce.

The report was prepared by R. J. Morley for the British intelligence objectives subcommittee. The Schmalfeldt process is compared with the Winkler method and comparative performance figures presented.

Cost of the report is $1.25.

Tennessee Gas Deliveries Up 13 Per Cent in 1947

HOUSTON.—Deliveries of natural gas through Tennessee Gas Transmission Co.'s pipe-line system from South Texas to West Virginia in 1947 totaled 108,750,000,000 cu. ft., an increase of nearly 13 per cent over 1946.

The 1947 increase would have been even greater had pipe deliveries for the expansion program been received earlier in the year, Gardiner Symonds, president, said in the company's annual report. Despite pipe-delivery difficulties, however, the system throughput was raised from 280,000,000 cu. ft. daily at the beginning of the year to 325,000,000 cu. ft. on December 31.

Reviewing company operations, Symonds said T.G.T.'s second line now being laid will probably be completed in the last quarter of this year. This will lift system capacity to 600,000,000 cu. ft. daily. Now pending before the Federal Power Commission is an application by the company to lay a third line and an extension into New England at a cost of about $165,000,000. This program, requiring several years to complete, will raise throughput to 1,055,000,000 cu. ft. daily.

FPC Denies Philadelphia Gas Emergency Deliveries

An application of Philadelphia Gas Works Co. for an order directing immediate deliveries of natural gas to it by Texas Eastern Transmission Corp. has been denied by the Federal Power Commission.

Philadelphia Gas had requested emergency deliveries of up to 10,000,000 cu. ft. of natural gas a day from Texas Eastern to replace a portion of the oil used as an enriching agent in the manufacture of gas distributed in Philadelphia.

S.C.M.A. Will Hear F. G. Philo, March 18

The Southern California Meter Association, which will meet at the Rio Hondo Country Club, Los Angeles, March 18, has chosen Frank G. Philo, chief mechanical engineer of the Southern California Edison Co., Los Angeles, as principal speaker.

Philo will speak on automatic control and its application to the new Redondo steam station, where he is supervisor of power - equipment design and installation.

Harold Nickle, of Precision Instrument Co., Long Beach, will speak on "Special Instruments and Their Applications."

East Tennessee to Get Additional Gas Supplies

The Federal Power Commission has modified its August 1, 1947, order to permit Tennessee Gas Transmission Co. to deliver sufficient gas to meet the requirements of East Tennessee Natural Gas Co.

The 1947 order authorized Tennessee Gas to construct new facilities but limited the delivery of gas to old customers. East Tennessee recently was authorized to construct facilities for the transportation of natural gas to Middle and East Tennessee.

Natural Gasoline

Program for N.G.A.A. Meeting Announced

Increased production of light ends at lower cost and better hydrocarbon utilization will be featured in papers at the twenty-seventh annual convention of the Natural Gasoline Association of America.

The convention will be held March 24-26 in Texas Hotel, Fort Worth.

Following is the convention program.

N.G.A.A. TENTATIVE PROGRAM OUTLINE
Wednesday, March 24—Cycling Session, 9:30 a.m.

"Corrosion in Gas - Condensate Wells," T. S. Bacon, Lone Star Producing Co., Dallas; "Condensation of Hydrocarbon-Water Mixtures in Fin Wall Tubes," Dr. D. L. Katz, University of Michigan, Ann Arbor, Mich.; "A Study of Cycling Operations for the West Austin Sand," Dr. Frank Dotterweich, Texas A. & I., Kingsville, Tex., and Charles B. Johnson, Jr., Gulf Plains Corp., Corpus Christi, Tex.; and "Application of Superexpansibility Factors in High-Pressure Gas Measurement," E. P. Valby, Richfield Oil Corp., Los Angeles.

Economic Session, 2 p.m.

"Significance of Liquids From Natural Gas," C. R. Williams, The Chicago Corp., Corpus Christi, Tex.; "Maximum Recovery of Hydrocarbons," W. J. Murray, Texas Railroad Commission, Austin, Tex.; "Modern Process Methods to Improve Propane Recovery," G. W. McCullough, K. H. Hackmuth, and A. J. Miller, Phillips Petroleum Co., Bartlesville, Okla.; and "Inflammability of Gases," G. M. Kintz, U. S. Bureau of Mines, Dallas.

Thursday, March 25—General Session, 9:30 a.m.

"More Propane for Less Money," Z. C. Ambrose, Southwest Gas Producing Co., Monroe, La.; "The Oil Industry Today," R. M. Chan, vice president, Magnolia Petroleum Co., Dallas; presentation of Hanlon Award, followed by the Hanlon Award address.

Motor Fuel Session, 2:00 p.m.

"Risk Capital in the Petroleum Industry," Richard Wagner, president, Chicago Corp., Chicago; "Engines and Fuels for Higher Efficiency," J. M. Campbell and L. L. Withrow, General Motors Corp., Detroit; and "Economics of Antidetonant Injection," C. H. Van Hartesveldt, vice president, Thompson Vita-Meter Corp., Cleveland.

Friday, March 26, 9:30

"Information Please" session, an all-morning quiz of 14 experts in different fields.

Magnolia to Dismantle Stonewall Gasoline Plant

Magnolia Petroleum Co. is planning to close its natural-gasoline plant at Stonewall, Okla., in Pontotoc County northeast of Fitts field, some time this summer. The plant is to be torn down and the equipment used elsewhere. Carter Oil Co. has made arrangements to take over Magnolia's connections in the field and process the gas.

The Stonewall plant has a capacity of 30,000 gal. of natural gasoline per day and also produces liquefied-petroleum-gas products.

BAASH ROSS TOOL CO.

Baash-Ross News

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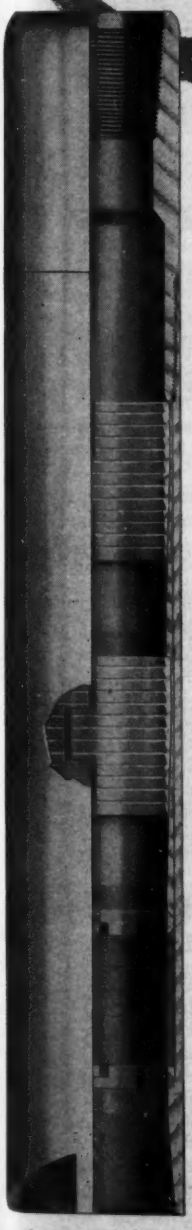
OUR 28th YEAR

Here's the tool for SIMPLE— POSITIVE— LEAKPROOF casing repairs

★ PRESSURE-TIGHT PACKING UNIT CANNOT EXTRUDE

★ DOES NOT REDUCE I.D. OF CASING STRING

★ DOES NOT DISTURB CASING CEMENT JOB

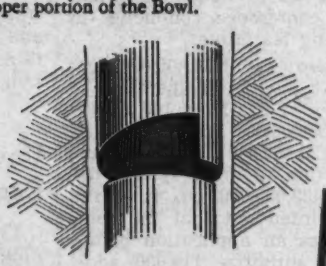


It's the BAASH-ROSS PACKING CASING BOWL

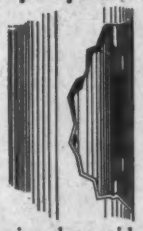
Repairing damaged or split casing strings is an easy, foolproof operation when you use this field-proven tool that has long been a dependable standby among leading operators throughout the world. It's the Baash-Ross Packing Casing Bowl—and it offers a number of important advantages on modern casing repair jobs . . .

Easy to Install!

Here's all you do to make a quick positive casing repair with the Baash-Ross Casing Bowl. First, cut the casing below the defective area (Baash-Ross makes a cutting tool that is ideal for this job!) and remove the upper portion of the string from the well. Discard the defective portion of the string, replace with good casing and attach a Packing Casing Bowl to the bottom of this replacement string. After the repaired casing string is run back into the well, it is lowered until the top of the casing standing in the hole passes completely into the Casing Bowl and seats against the shoulder in the upper portion of the Bowl.



Then the string is simply raised a short distance to set the slips and expand the lead packing to a permanent, pressure-tight fit against the casing in the well . . . the casing suspended at the surface in the usual manner to retain the tension . . . *and the job's done!*



FOOLPROOF PACKING ELEMENT

Note in the cutaway view of the Packing Casing Bowl how the upper and lower steel rings that retain the lead packing elements have a compressible joint like a piston ring. This permits them to close around the pipe along with the lead as it expands, thus preventing the lead from extruding out of the packing area. Result—a tight leakproof pack-off between the old and new casing sections, without need for cementing or other complicated sealing operations!

FULL INSIDE DIAMETER

Another important advantage is that the *minimum* inside diameter of the Baash-Ross Casing Bowl is equal to that of the Casing to which it is attached. Any tools, liners or other equipment that will pass through the casing string will also pass through the Casing Bowl without hanging up!

CEMENT JOB IS UNAFFECTED

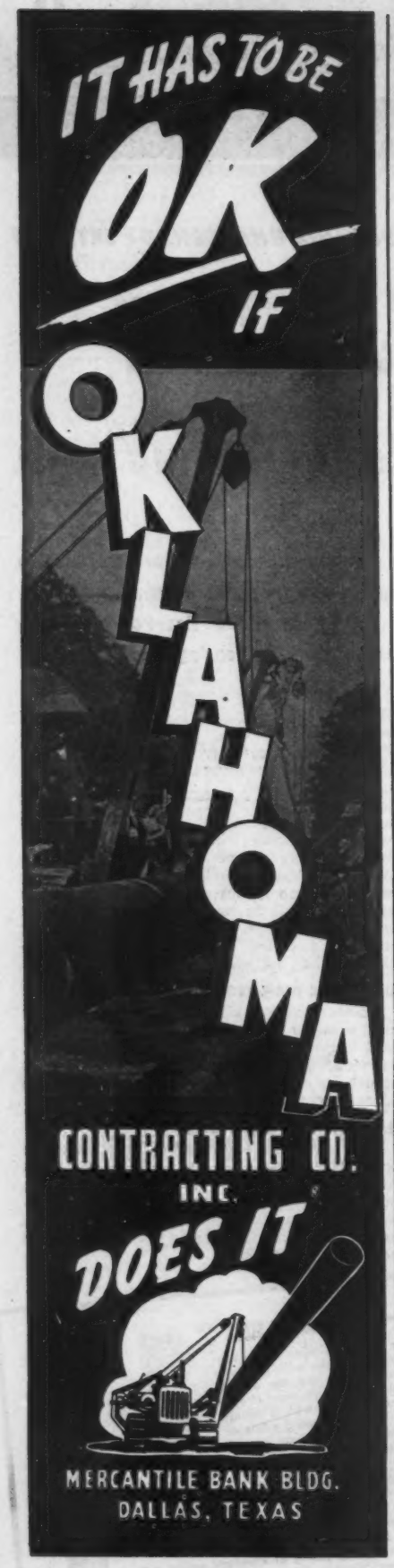
Since the Packing Casing Bowl attaches to the top of the casing standing in the hole, the cement shut-off around the shoe is not disturbed. This, coupled with the tight leakproof joint effected between the Casing Bowl and the casing in the hole, assures the repaired string being just as watertight as the original casing job.

TWO TYPES—FULL RANGE OF SIZES

Baash-Ross Packing Casing Bowls are available in two types—one with a *single* set of slips for gripping the top of the casing in the hole for use with short strings of casing . . . and the other with a *double* set of slips where extra gripping efficiency is desired on longer casing strings. In both types the packing element is essentially the same.

Both the Single and Double Slip Types are available in a complete range of casing sizes. In each size the O.D. of the Casing Bowl is not much greater than that of the casing joints, so that it can readily be run inside the surrounding casing of standard casing programs. Made of heat-treated alloy steel, each size of Casing Bowl has ample strength to withstand the most severe strains and pressures with a high safety factor.

Available through leading supply stores



PIPE LINES

Texas Eastern Reveals Plans for 26-in. Line

HOUSTON.—Texas Eastern Transmission Corp. is preparing plans for a new natural-gas pipe line which would parallel the Big Inch from Longview, Tex., to Pittsburgh with a gas-supply extension to Southwest Texas.

The new 26-in. line would cost in the neighborhood of $150,000,000 and would supplement Texas Eastern's existing system consisting of the 20-in. Little Big Inch and the 24-in. Big Inch which the company bought last year from War Assets Administration.

An application for the construction of the new line is expected to be filed with the Federal Power Commission in the near future. The extension would be laid about 400 miles southwest from Longview through Colorado County and to the Corpus Christi area.

The new line would be the third in the Texas Eastern system. Through the two converted Inch oil lines, Texas Eastern is now delivering about 280,000,000 cu. ft. of gas daily to eastern markets. In view of the deliveries from the system in Pennsylvania and Ohio, plans for the new line are understood to call for its termination at Pittsburgh. Present Inch lines extend to Philadelphia, and system balance would be maintained by ending the new line at Pittsburgh.

Operations of Texas Eastern during the past year were reviewed last week by George R. Brown, board chairman, and R. H. Hargrove, president, in a letter to stockholders and in a press conference conducted in Shreveport by Hargrove.

Texas Eastern spent $4,900,000 during its first 8 months of operation to raise delivery of gas from 140,000,000 cu. ft. to 235,000,000 cu. ft., and an additional $20,100,000 will be spent for construction to bring system deliveries to 433,000,000 cu. ft. daily. Hargrove pointed out that the company now has an application before the FPC to authorize 114,000 additional compressor horsepower which will provide a further increase in capacity to 508,000,000, cu. ft. daily.

"This new program would in effect step up our construction time table by approximately a full year, since 508,000,000 cu. ft. daily is now our scheduled goal for the winter of 1949." Hargrove said. "But the need for natural gas requires us to undertake this emergency schedule. We estimate that the increase from 433,000,000 to 508,000,000 cu. ft. a day will increase the over-all capital cost of the Inch system, including the cost of acquisition, to about $181,400,000, which would be about $9,000,000 more than the original cost estimated to develop 433,000,000 cu. ft. maximum capacity announced in the annual report."

Texas Pipe Line Co. Lets Three New Contracts

HOUSTON.—Texas Pipe Line Co. has awarded three contracts for work on crude-oil pipe lines and auxiliary installations in West and Southeast Texas.

Latex Construction Co., Houston, received a contract to lay an 87-mile, 20-in. crude line from the pipe-line company's East Houston station to Port Arthur and Port Neches. The Texas Co. operates a 135,000-bbl. capacity refinery in Port Arthur and a 40,000-bbl. plant in Port Neches. Work on the pipe-line project is scheduled to begin in March.

The other two contracts were for work on station sites on the Jal, N. M.-Cushing, Okla., 20, 22, and 24-in. line being built by Texas Pipe Line and owned on an undivided-interest basis by Texas Pipe Line, Shell Pipe Line Corp., Empire Pipeline Co., and Sinclair Refining Co.

Morrison Brothers Construction Co., Inc., Odessa, Tex., was awarded a contract to install manifolds and tank-farm lines at the Jal and Midland, Tex., stations. D. S. & R. Construction Co., Kermit, Tex., received a contract for the grading and earthwork and to build concrete-ring foundations for three additional 122,000-bbl. tanks at Jal.

United Gas Plans Large Expenditures in 1948

United Gas Pipe Line Co. is planning the expediture of $14,000,000 during 1948, most of which will be devoted to the construction of additional main transmission lines.

The project will constitute more than half of a $26,000,000 expansion program announced recently by N. C. McGowen, president of United Gas Corp., parent company of United Gas Pipe Line.

About 25 specific projects for extending the main transmission line

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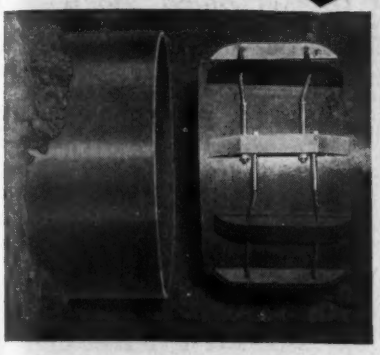
The New *Williamson*
PIPE LINE CASING
INSULATOR*



This device — simple, rugged, economical — supports and guides the leading end of coated line pipe into the right-of-way casing under railroads and highways.
1—To protect the pipe coating.
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*Patent pending.

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Cut & Bevel Any Pipe
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Maximum SPEED
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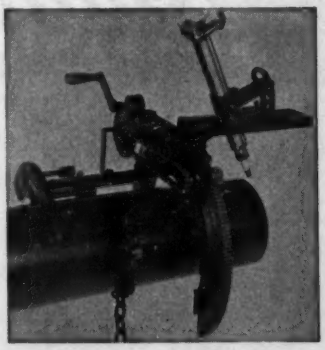

The H & M PIPE CUTTING and BEVELING MACHINE

SPEED: Complete cut and bevel can be made on 12 inch pipe in about 2 minutes.

ECONOMY: Save approximately one-half labor and gas costs.

PORTABILITY: Can easily be carried from one pipe section to another.

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Pipe Beveling Machine Co.
611 Petroleum Building, Tulsa, Oklahoma

system are planned. Largest of the group will be a $3,000,000 project to provide facilities to gather, dehydrate, and transport gas from Baxter field, Mississippi, to Mobile, Ala., a distance of more than 90 miles.

The company also plans, at a cost of $2,500,000, to expand its compressor facilities and lay pipe lines to meet power-plant and industry requirements in the Dallas-Fort Worth area.

A total of $1,725,000 has been set aside for construction of gas-gathering lines during the year.

Cities Service Gets First Pipe Shipments

The first shipments of steel pipe to be used in the construction of Cities Service Oil Co.'s 400-mile natural-gas pipe line to be built in 1948-49 have been unloaded at Olathe, Kans.

Officials expect that by October enough pipe will have arrived to complete the first section of 181 miles of the new 26-in. high-pressure line from Hugoton gas field, near Ulysses, Kans., to a point south of Hutchinson, Kans.

Construction of a new crossing under the Arkansas River south of Hutchinson already has begun.

Possible New Pipe-Line Techniques Indicated

Possible new pipe-line techniques are indicated in recently announced technical developments of General Electric Co., Westinghouse Electric Corp., and Allis-Chalmers Manufacturing Co.

Application of new high-temperature ceramic glazes to combustion chamber liners and buckets of gas turbines, a development still in the research stage, may result in the commercial application of gas turbines for driving centrifugal pumps and compressors. Such ceramics promise to lengthen gas-turbine life.

Gas turbines have been tested exhaustively for application to locomotive, marine, and stationary power plants. Westinghouse tested a 2,000-hp. experimental gas turbine for more than 600 hours at full design temperature of 1 350° F. with no distortion, measurable creep, oxidation, or distress of turbine blade material.

The mechanism of deposit of metal from an arc-welding rod may be determined through research made possible by a new machine capable of taking X-ray motion pictures at high speed.

Use of induction heating for surface hardening is continuing to expand, making possible longer life for many items such as valves, pins, cams, and shafts.

Radiography of castings and weld-

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ing has been facilitated by fast X-raying through the means of a 10,000,000-volt betatronx which will X-ray 10 in. of steel in a few minutes.

Frontier Seeks Permit For 65-Mile Crude Line

Frontier Refining Co. has filed application with the Colorado Public Service Commission to build a $750,000, 65-mile pipe line from Mush Creek and Ant Hills fields in Weston County, Wyoming, to a terminal of Rocky Mountain Pipe Line Co.'s line at Lance Creek field near Lusk, Wyo.

Daily capacity of the new line will be between 4,500 and 6,000 bbl. Rocky Mountain Pipe Line Co. now supplies the Cheyenne and Denver refineries.

Mercury Refining Co. To Build 5-Mile Line

Mercury Refining Co., Oklahoma City, is preparing to construct a 5-mile, 4-in. crude line from East Brady field in Garvin County to Interstate Oil Pipe Line Co.'s 10-in. line running from Oklahoma City to Garvin-McClain and Velma fields.

Mercury will install tanks on Interstate's property and truck oil from there until the line is completed in about 30 days. The company expects to take approximately 1,000 bbl. daily in East Brady field.

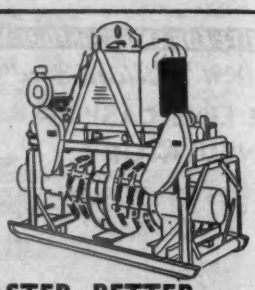
Gulf Completes Looping Of West Texas Line

Gulf Refining Co., Houston Pipe division, is completing this week the construction of 100 miles of 10-in. loops along the company's main crude-oil line from West Texas to the Gulf Coast. As a result of these loops, the capacity of the system will be increased 5,000 bbl. daily.

Michigan Gas Storage Plans Compressor Station

The Federal Power Commission has granted temporary authorization to Michigan Gas Storage Co. to construct a $559,400 compressor station on Panhandle Eastern Pipe Line Co.'s north line near Flint, Mich. The station will increase gas deliveries into the company's storage field.

The proposed station would consist of four compressor units of 1,000 hp. each and would increase the capacity of the line by about 24,000,000 cu. ft. per day. Construction of this station is considered by the company only as a temporary measure until a previous authorized line can be completed.



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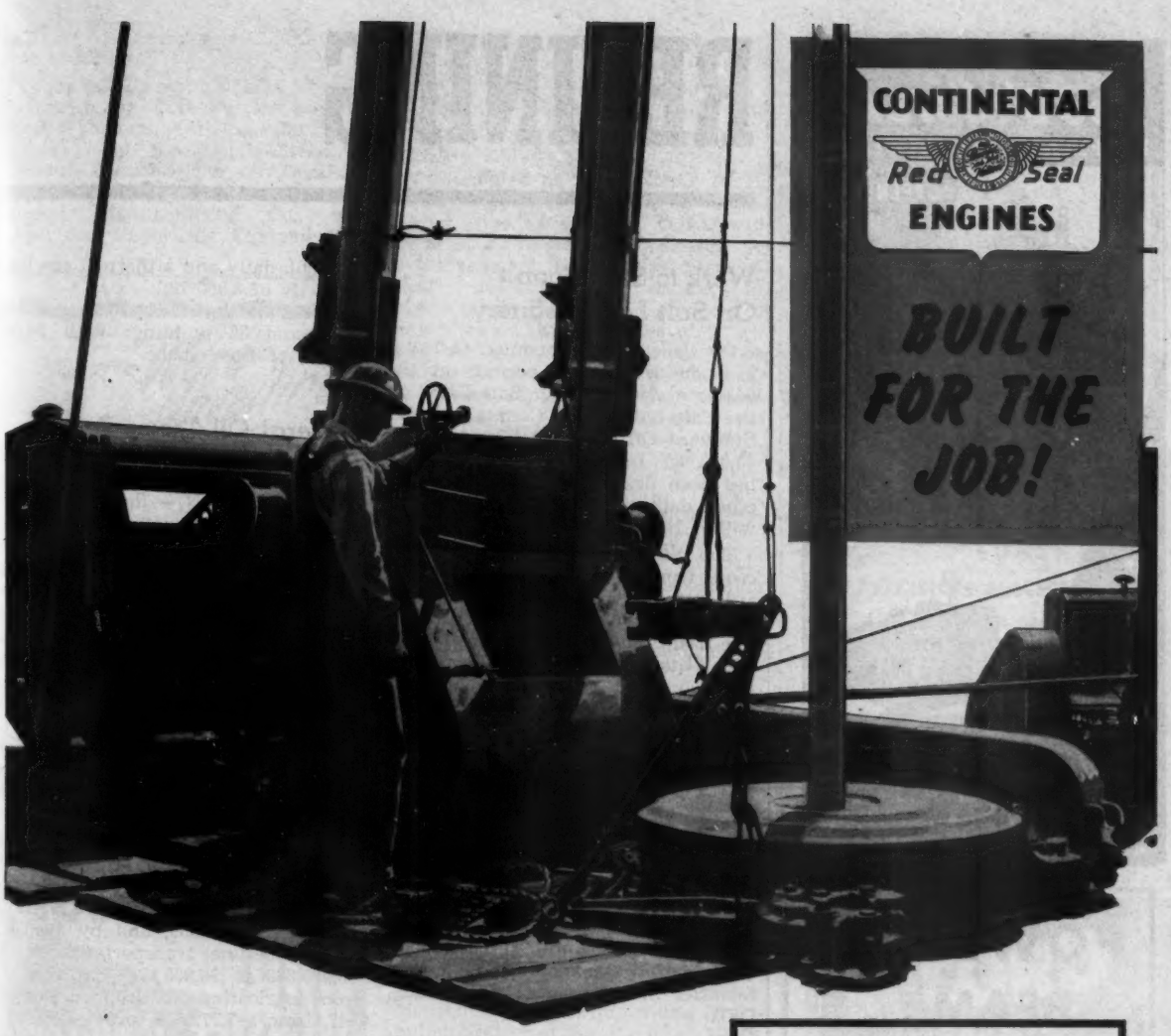

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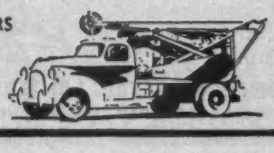

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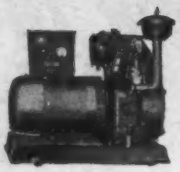

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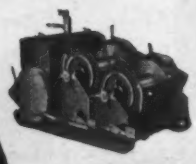

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REFINING

Work to Start Soon On Salt Lake Refinery

Construction is scheduled to begin as soon as weather permits at the 600-acre site in North Salt Lake on the Salt Lake-Davis County line, on Standard Oil Co. of California's new $5,000,000 refinery. Initial capacity has been designed for 25,000 bbl. of crude daily. Completion is scheduled within the next 12 months.

The refinery is to be supplied with crude from Rangely field, and Standard interests are planning construction of a 160-mile, 10-in. crude-oil line from Rangely, Colo., to Salt Lake City, Utah. Construction operations are scheduled to start in May or June. The line will have a capacity of 22,000 bbl. daily.

The refinery will serve the Boise Basin and Spokane-Walla Walla areas.

Midland Cooperative Plans Cushing Refinery Expansion

Midland Cooperative Wholesale Co. is planning to begin in March a $500,000 program to expand and improve facilities in its refinery in Cushing, Okla.

The program is expected to increase the refinery's capacity by 50 per cent, company officials said. The refinery now has a rated capacity of 4,000 bbl. of crude daily, with a cracking capacity of 1,800 bbl.

Republic Buys Texas City Refinery From WAA

A refinery at Texas City, Tex., operated during the war by Republic Oil Refining Co. for the production of aviation fuels has been bought by Republic from War Assets Administration for $2,300,000.

Republic plans to spend $250,000 during the next 6 months for rehabilitation of the refinery. The refinery, formerly owned by Defense Plant Corp., includes reforming, fluid catalytic cracking, and HF alkylation facilities. The catalytic cracking unit is rated at 12,000 bbl. capacity.

The plant was built by the Government at a cost of $11,234,000. It is located adjacent to Republic's Texas City refinery, which has a current rated crude capacity of 35,000 bbl. daily and a thermal cracking capacity of 8,500 bbl.

The sale included 16.8 acres of land and 32 buildings with 50,000 sq. ft. of floor space.

Federal Oil Taxes Drop Sharply in January

WASHINGTON. — Revenues from the three federal oil taxes dropped sharply in January, it was reported by the Internal Revenue Bureau March 2.

Collections on gasoline dropped to $30,851,344 from $49,040,907 in December, the bureau announced, while the "take" from lubricating oils dropped to $5,460,848 from $8,552,554, and from pipe-line transportation to $813,313 from $1,799,999. As compared with January 1947, however, the only significant change was a $4,000,000 decline in gasoline-tax receipts.

The bureau reported that for the first 7 months of the Government's fiscal year, revenues from gasoline increased $17,693,264, from $265,117,694 to $282,810,959, and by $946,012 from pipe-line transportation, from $8,959,863 to $9,905,875, but receipts from lubricating oils dropped $3,336,747, from $47,772,556 to $44,435,809.

Socony-Vacuum Emulsion Will Raise Paper Output

An aromatic oil emulsion developed by Socony-Vacuum Oil Co., Inc., may be used to increase high-grade paper pulp production 10 per cent, according to a paper presented at the annual meeting of the Technical Association of The Pulp and Paper Industry.

The Socony-Vacuum product, in addition to increasing tonnage production, also produces an improved pulp of greater brightness which is subject to less pitch troubles, the company said.

Oil-Heat Institute Annual Meeting to Be April 5-8

Robert E. Wilson, board chairman of Standard Oil Co. (Ind.), is scheduled to speak on "Burning Oils" at the silver anniversary convention of the Oil-Heat Institute to be held in Chicago April 5-8. Wilson will speak on

April 8. All meetings will be at the Palmer House.

Other speakers will include Stephen P. Cauley and E. B. Delgass, both of Socony-Vacuum Oil Co., Inc., co-authors of a paper on "Effects of Revised Specifications on Distillate Fuel Oils." A. T. Atwill, president of Quaker Manufacturing Co., will speak on "Vaporizing Equipment in 1948," and Fred Hainer, vice president of Cleaver-Brooks Co., will deliver a paper on "Package Steam Units."

A change in O.H.I. constitution will be presented to the membership for approval at this meeting.

"If adopted as anticipated," A. E. Hess, managing director of O.H.I. stated, "the activities of O.H.I. will broaden so as to be of interest to every segment in the oil burning industry, including the producers of burning oils. The change includes a new division, the activities of which will be keyed to a laboratory to be set up for the study of standardizations and for investigating various phases in the art of oil burning and the use of liquid fuels."

S.A.E. Schedules Second Transportation Meeting

The second national transportation meeting of the Society of Automotive Engineers will be held March 30-April 1 in the Bellevue-Stratford Hotel, Philadelphia.

Of principal interest to the oil-industry representatives will be a discussion of fuel injection as a substitute for carburetors, to be led by G. M. Lange and C. W. Van Overbeke, Ex-Cell-O Corp., Detroit.

Coal-Research Report Now Being Distributed

"Annual Report of Research and Technologic Work on Coal, Fiscal Year 1947," is a report now being distributed by the Publications Distribution Section of the Bureau of Mines.

The report includes results of coking and gasification studies, including attempts at underground gasification at Gorgas, Ala. Synthetic liquid fuels also receive special attention in the report, which may be obtained free from the publications section.

Sulfuric Acid Safety Described in M.C.A. Manual

A new manual on safe handling of sulfuric acid has been issued by the Manufacturing Chemists Association as the latest in its series of chemical product safety manuals.

The booklet is designed for plant supervisors and workers handling sulfuric acid and describes such aspects as the physical and chemical properties of the product, usual shipping containers and methods of handling, unloading and storage precautions, requirements for caution labels, and recommended personal protective equipment. Health hazards and their control are covered in a section prepared by the medical advisory committee of qualified physicians and toxicologists.

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SIGHT
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McCord "Clearsite" plastic sight feeds provide a new degree of visibility and clearness, supplying positive proof of oil delivery. Due to its design this sight feed may be used as an independent sight at point of lubrication. As an accessory it can be added to any lubrication system. Specify "Clearsite."
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Exploration and Drilling

Why There Is So Much Interest in Sedimentology

IN recent years exploration scientists have been talking more and more about sedimentology, and a little less about structure. The most striking example is the American Association of Petroleum Geologists' program of fundamental research, which is now under consideration by the American Petroleum Institute. This program in essence is simply a proposal for a large-scale, coordinated research attack on problems in sedimentology.

The name of the subject looks forbidding, but the meaning is simple. It means the laws of scientific principles governing sediments. We find oil almost exclusively in sedimentary rocks. In fact almost all of it is found in sedimentary rocks deposited under sea water, or perhaps under brackish water, only partly cut off from sea water. Therefore a study of the laws governing these sediments makes sense in hunting for oil.

Like many things, the present emphasis on sedimentology is not a new idea. It has gradually grown and become more and more important the longer a lot of people gave serious thought to what their problems were. The current demand for micropaleontologists (or sedimentologists) is good evidence that many exploration executives are arriving at the same conclusions at about the same time.

It may surprise oil men who have not been following the trend of geological thinking closely to find that many geologists today do not think of structure in terms of an oil trap, but rather as an indication of a place where the geological environment was favorable for the deposition of good oil reservoir sediments.

More than a few geologists, including some outstanding ones, believe we had cause and effect twisted around in the old theories about structures being the best places to look for oil accumulations. Any classification of actual proven oil reservoirs by types of structural traps soon gets into a very elaborate system, in order to try to encompass all the known fields. On the other hand, a pretty good cause can be made to show that although most oil fields are associated with structure; the oil accumulation does not match the structural pattern.

The other side of this coin is that a pretty good case can be made to demonstrate that regional structural conditions, and large local variations of such regional structures, exerted a strong influence on the environment in which the sediments were being laid down. At various places, seldom exactly on top of the regional structure, conditions were favorable for the development of good reservoirs. In these reservoirs we find oil fields. On top of the structure, where the environment was not favorable to the development of good reservoirs, we get dry holes.

So, many geologists still look for structures, with every tool at their command. But having found the structure, they try to draw conclusions about where the sedimentary environment was favorable to the development of good reservoir beds. To these men, "strat traps" are not a separate type of accumulation, but rather a more difficult and expensive one to try to find.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

TEXAS GULF COAST.—Humble Oil & Refining Co. 1 South Mayes Unit, new record for deep production in Texas, has been completed at 12,021-26 ft. in the lower Frio sand for 135 bbl. of oil and 1,344,000 cu. ft. of gas through ⅛-in. choke. The well is located approximately 1 mile southwest of South Mayes field in Chambers County.

ROCKY MOUNTAIN.—The Mush Creek area, Weston County, Wyoming, gets increased activity with a 750-bbl. producer, and a 3½-mile extension. Sinclair Wyoming is completing their 22 Unit, a deepening in Wertz field, Sweetwater County, as the first Amsden producer in Wyoming. Mountain Fuel Supply Co.'s wildcat in Emery County, Utah, is drilling below contract drilling depth and past 7,605 ft.

SOUTH LOUISIANA.—At last report, The Texas Co. 4 State-Barataria, Lease 346, in Township 20s-25e, Queen Bess Island, Jefferson Parish, was drilling below 15,452 ft.

NORTH CENTRAL TEXAS.—Development of the Chico area continues, with Cities Service 1 Flowers, a west offset to the new field, completed for 225 bbl. of oil per day from the conglomerate at 5,195-5,212 ft.

MICHIGAN.—The state's deepest well found no commercial shows of oil or gas and was completed as a failure at 11,012 ft. The shallowest producer in the state pumps over 100 bbl. per day from Traverse lime at 655 ft., TD.

CANADA.—Leduc's first dry hole in a year's period of successful completions was recorded at Imperial Oil Co. 38, in the south end of the field. Flank Petroleums starts a test in the Athabaska district.

EAST TEXAS.—Magnolia Petroleum Co. 1 Fair, Smith County, is showing for a good distillate producer from the Rodessa at 9,512-72 ft.

WEST TEXAS.—Chancellor, Slick Oil Co. et al are deepening their Pecos County test, the 1 Thornton Davis, which recovered gas and distillate at 9,615-80 ft.

MISSISSIPPI

La Grange Field Is Assured North Extension

JACKSON.—A ½-mile northward extension to La Grange field, Adams County is assured at James E. Kemp 1 Elizabeth Stanton (Windy Hill Manor), Section 84-7n-2w. After drilling to total depth of 6,300 ft., electric log was run and following tops were picked: Votaw 1,963 ft., Yazoo 2,071 ft., Cook Mountain 2,915 ft., Sparta 3,162 ft., Zilma 3,985 ft., Wilcox 4,320 ft., Baker shale 6,134 ft., Baker oil sand 6,210-24 ft., Wilson sand 6,232-42 ft., Parker sand zone 6,260 ft. Casing is now being moved in to the location and the Baker oil sand will be tested.

Also at La Grange, James E. Kemp 4 H. M. Marks, 8-6n-2w, has been completed as one of the better Baker sand wells in the field. Producing through perforations at 6,215-18 ft., the well flowed at the rate of 192 bbl. of 38.4°-gravity oil per day through an 11/64-in. tubing choke with flowing pressure of 275 psi.

On the west side of this La Grange extension area, Sohio-Roeser & Pendleton 1 De Marco, 8-6n-2w, has recovered oil from drill-stem test of perforations at 6,195-6,201 ft. in the Baker sand. Casing is to be reperforated for another test.

In Yellow Creek field, Wayne County, Humble Oil & Refining Co. B-3 G. M. & O. Land Co. has been perforated in the Stanley sand from 5,072 to 5,115 ft. and pump is being installed for completion.

One wildcat location in Lincoln County and seven development starts, two each in Gwinville field, Jeff Davis County, and Ovett field, Jones County, and one each in Heidelberg field-West, Jasper County; La Grange field, Adams County; and Mallalieu field, Lincoln County. Two wildcat failures were completed, one each in Adams and Jones counties.

MISSISSIPPI WILDCAT FAILURES

Adams County: Roeser & Pendleton, Inc., 1 Natchez Airport, 53-8n-2w, dry, TD 10,339 ft. Tops: Wilcox 4,070 ft., Selma 8,435 ft., Austin 9,030 ft., Base Austin 9,306 ft., Marine Tuscaloosa 9,840 ft., Lower Tuscaloosa 10,139 ft., Massive sand 10,198 ft., Comanche 10,321 ft.

Jones County: Harris - Payne - Johnson 1 J. E. Yarber, NW SE 36-10n-10w, dry, TD 7,085 ft., tops: Eutaw 5,326 ft., Tuscaloosa 5,852 ft., Marine Tuscaloosa 6,595 ft., Base Marine Tuscaloosa 6,770 ft., Massive sand 6,897 ft.

FLORIDA WILDCAT FAILURE

Lafayette County: Humble Oil & Refining Co. 1 R. L. Henderson, 20-4s-11e, dry, TD 4,235 ft.

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SOUTHWEST TEXAS

New Oil Production Is Seen in Webb County

CORPUS CHRISTI.—New oil production is indicated in southeastern Webb County, approximately 6½ miles southwest of Bruni, and almost 2 miles northeast of North Albercas field. O. W. Killiam et al 2 Marrs McLean, wildcat test, recovered 1,770 ft. of pipe-line oil with 6 psi. working pressure on a 1-hour drill-stem test made at 2,337-42 ft., using ¼-in. chokes top and bottom. Operators then cored at 2,345 ft. and new test is being made.

Baldridge & King et al 3 Mrs. S. K. East, wildcat test in Jim Hogg County, approximately 16 miles southwest of Hebbronville and 6½ miles south of the Armstrong field, flowed oil on a drill-stem test at 3,865-75 ft., open for 20 minutes. Operators cored 5 ft. more, still in oil sand, and set casing for completion. Top of Pettus sand was found at 3,865 ft. This well is in H&GN Survey 36.

Final gage for Producers Development Co. 1 Louis Bailey, new gas pool opener in Nueces County, 1½ miles east of Agua Dulce and 1½ miles west of Agua Dulce field, has been reported. It gaged 14,500,000 cu. ft. of gas per day on open flow, plus condensate, with shut-in pressure of 2,380 psi., gravity 58°.

A 1-mile south-southwestward extension to Bishop field in Nueces County, has been indicated at H. R. Smith & W. C. McBride, Inc., 1 H. F. Pierce. On drill-stem test on the 7,100-ft. sand it recovered 1,300 ft. of oil with 420 psi. working pressure, through a ¼-in. choke. This well is in the F. Z. Bishop Subdivision of Well ranch.

Arnold O. Morgan 1 W. S. Crabb, wildcat in San Patricio County, in southeast corner of Block 10 of the J. J. Welder and Coleman-Fulton Pasture Co. Subdivision of George Morris Survey, developed 590 psi. working pressure and recovered 15 ft. of condensate on an 8-minute drill-stem test at 5,491-98 ft. Operators now are drilling ahead below 7,398 ft.

There were 47 new locations reported for Districts 1 and 4, with 13 being wildcat starts, 2 each in Bastrop, Duval and Nueces counties, and 1 each in Edwards, Jim Hogg, Jim Wells, San Patricio, Starr, Uvalde and Webb counties. One successful wildcat opened a gas pool in Nueces County while 13 were dry, 3 in Duval, 2 in Starr, and 1 each in Atascosa, Bexar, Hidalgo, Jim Hogg, McMullen, Nueces, San Patricio and Zapata counties.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) SUCCESSFUL WILDCAT

Nueces County: New gas pool—Producers Development Co. 1 Louis Bailey, Lot 15, Agua Dulce Farm Lots, 1½ mi. E

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Advance-Design Trucks for 1948

Only Advance-Design Trucks for 1948 Have All These New and Finer Features:

★ **New Chevrolet 4-Speed Synchro-Mesh Truck Transmission** Entirely new Chevrolet developed Synchro-Mesh transmission assures truck users of unparalleled new ease and efficency in truck operation!

★ **New Chevrolet Advance-Design Gearshift Control** Unrivaled new convenience and ease of operation in Advance-Design models with 3-speed transmission. Gearshift is mounted on the steering column to provide new efficiency on every hauling job!

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**Fresh air heating and ventilating system and rear-corner windows optional at extra cost.*

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of Agua Dulce and about 1½ mi. W of Agua Dulce field, top pay 6,148 ft., TD 6,210 ft., perf. 6,148-58 ft., IP: 14,500,000 cu. ft. gas per day on open flow, plus condensate, shut-in pressure 2,380 psi., gravity 58°.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) WILDCAT FAILURES

Atascosa County: J. B. Burleson and Dallas C. Biggers, Trustee 2 Marrs McLean, in J. Poitevent Sur. 7, in Charlotte area, dry, TD 5,357 ft.

Bexar County: H. A. Rice 1 Mathias Becker, in W. T. McNeil Sur. 62,, 3 mi. SW of Gas Ridge field and 1 mi. N of McDanna, dry, TD 800 ft. in Edwards lime.

Duval County: Bridwell Oil Co. 1 J. T. Dinn, in H. K. Allison Sur. 464, 10 mi. N of Hebbronville, 2½ mi. N of Cam field, dry, TD 3,060 ft.

John F. Camp 1 Camilo Palacios, in J. Poitevent Sur. 3, 1 mi. W of Rosita, 5 mi. W of Muralla field, dry, TD 4,046 ft.

Edwin B. Cox & Jake L. Hamon 2-B Lucille Gruy Est., in N. Gussett Sur. 154, 2 mi. SE of Rancho Solo field, dry, TD 2,509 ft.

Hidalgo County: Coastal Refineries, Inc., 1 Yturria Land & Livestock Co., in Antonio M. Cano Porcion 44, 5 mi. NE Sullivan City, dry, TD 5,913 ft.

Jim Hogg County: Baldridge & King et al 2 Mrs. Sarita K. East, in H&GN Sur. 36, 16 mi. SW of Hebbronville, dry, TD 4,517 ft.

McMullen County: Newman Bros. & Alaska Stemship Co. B-10 South Texas Syndicate, Inc., in E. M. Beall Sur. 26, NE of Little Alamo field, dry, TD 3,925 ft.

Nueces County: Rock Hill Oil Co. & Geo. B. Buescher 1 Johanna W. Mann, Sec. 162, Bishop's Subd. of Weil ranch, 4 mi. W of Bishop, dry, TD 7,589 ft.

San Patricio County: Skelly Oil Co. 1 E. O. Ramsey, in Albert von Roeder Sur., 1½ mi. E-NE of Calallen, dry, TD 7,610 ft.

Starr County: Coastal Refineries, Inc., & W. D. Kennard 1 Louis Pena, Tract 151, Porcion 38, 4 mi. N of Sullivan City, dry, TD 4,437 ft.

Floyd L. Karsten 1 Margo Est., in Las Comitas Grant, 2 mi. S of Las Comitas and 6 mi. NW of Sun field, dry, TD 5,811 ft.

Zapata County: Moss & Adams 1 Delia M. Vela de Vasquez, in Porcion 34, 10 mi. E-NE of Zapata, dry, TD 2,250 ft.

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in any weather . . . on any pipe . . .

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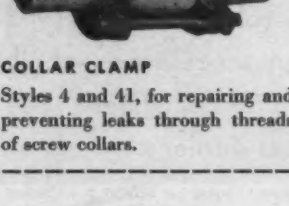
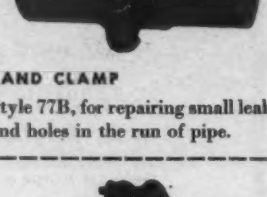
The four styles shown here are just part of Dresser's complete line of repair products. See them at your oilfield supply store or write for our Oilfield Catalog. Overnight delivery throughout the southwest from our Houston warehouse. Keep Dressers in stock and have the jump on emergencies.



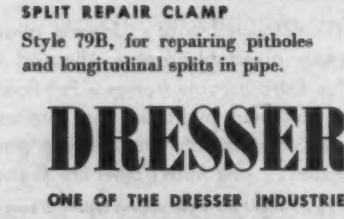
COLLAR CLAMP

Styles 4 and 41, for repairing and preventing leaks through threads of screw collars.



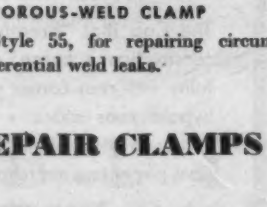
BAND CLAMP

Style 77B, for repairing small leaks and holes in the run of pipe.



SPLIT REPAIR CLAMP

Style 79B, for repairing pitholes and longitudinal splits in pipe.



POROUS-WELD CLAMP

Style 55, for repairing circumferential weld leaks.

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MICHIGAN

Deepest Well a Failure, Shallowest a Success

SAGINAW.—Interest in Michigan oil circles last week centered on three developments, two good, one bad.

The state's record deep-drilling operation was officially pronounced a failure, the oil search ending at a depth of 11,012 ft.

As that northern Michigan venture ended, the state's shallowest producing well was computed in the western section, and in north central Michigan a well coming in at 2,800 bbl. a day was completed as an offset to a December discovery in Bay County.

Of last week's 12 completions, 5 were oil wells with total initial potential of 3,075 bbl. a day. Five of the dry holes were wildcats.

The abandoned deep well is the Ohio Oil Co.-Pure Oil Co. 1 Reinhardt Consolidated in Section 35 of West Branch Township, Ogemaw County. The venture cost the two companies a reported $1,000,000, drilling halting a year to the day from the beginning of operations.

While no showings of oil or gas in commercial quantities were found, spokesmen said the geological data would prove valuable. They added that the failure would not be reflected in any lessening of exploration in Michigan, predicting that the 1948 rate of wildcatting would equal or exceed that for the past year. One of the deepest drillings for oil east of the Mississippi, the Ohio-Pure operation went 565 ft. deeper than the previous deep record for Michigan in the Gulf Refining Co. 1 Bateson, drilled in 1941 near Kawkawlin, which produced some oil and gas at shallower levels, but was finally abandoned a few years ago.

The fast-flowing Bay County offset completion is the Swan-King Oil Co. 3 Kurzega, in Section 27 of Fraser Township, ½ mile southwest of the discovery across the line in Section 35 of Pinconning Township.

The western Michigan shallow wildcat is the Sewage Sanitation Co. 1 John Foster, producing from Traverse limestone at a depth of 655 ft. in Section 2 of Niles Township, Berrien County. It is producing slightly more than 100 bbl. a day of thick crude, heavily charged with gas, which is shipped to nearby Gary, Ind., to a refinery. The only other oil well in the county was completed about a year ago a mile from the new producer but its yield is only about 2 bbl. a day.

Old records indicate that the record shallow well in Michigan was located near Port Huron and that there was some production from it between the years 1886 and 1912, a decade before any extensive oil development in the state.

Other new production in Michigan is from a 15-bbl. well in Arenic County, a 60-bbl. well in Section 18 of Bay County's Pinconning Township, and a 100-bbl. addition to the Kimball Lake field in Newaygo County.

The nine new locations are in eight counties, two in Allegan, one each in Midland, Montcalm, Crawford, Roscommon, Isabella, Berrien and Newaygo.

MICHIGAN SUCCESSFUL WILDCAT

Berrien County, Niles Township: Sewage Sanitation Co. 1 John Foster Estate, SE NW NW 2-7s-17w, pumping 100 bbl. in Traverse limestone, TD 655 ft.

MICHIGAN WILDCAT FAILURES

Bay County, Pinconning Township: Henry L. McEvoy 1 Anna Miller, SE SE NE 6-17n-4e, dry in Dundee, TD 3,036 ft.

Clinton County, Victor Township: Joseph W. Surdman 1 Gracie Sexton, SW NE NW 29-6n-1w, dry in dolomite, TD 2,957 ft.

Genesee County, Forest Township: Fred W. Craft 1 James H. Peterson, NE NW NW 16-9n-8e, dry in Dundee, TD 2,656 ft.

Mason County, Logan Township: John A. Thompson 1 Jasper R. Fuller, SW SW SW 34-17n-15w, dry in Sylvania, TD 3,412 ft.

Ogemaw County, West Branch Township: Ohio Oil Co.-Pure Oil Co. 1 Reinhardt Consolidated, C SE NW NW 35-22n-2e, dry, TD 11,012 ft.

TEXAS GULF COAST

New Pools Opened In Three Counties

HOUSTON.—A new oil field in Calhoun County, approximately 7 miles southwest of Port Lavaca and 4 miles southsoutheast of Sheriff field, has been opened by C. G. Glasscock, Jr., and Pontiac Refining Co. 1 McDonald & Frels. On potential gage the well flowed 113 bbl. of 41.5°-gravity oil per day, plus 2 per cent wash water through a ¼-in. choke, with 900 psi. tubing pressure and 1,020 psi. casing pressure. This well is located in the west corner of Section 19 of R. Garrett Subdivision 1, in I&GN Survey 6.

Rock Hill Oil Co. 1 J. M. Halamicek opened the new oil pool Sandy Creek in Jackson County flowing an initial production of 106 bbl. of oil per day through a ½-in. choke. Total depth is 5,610 ft., with perforations at 4,560-64 ft. This new pool is 2 miles west of Ganado and ½ mile northwest of West Ganado field, in the S. C. A. Rogers Survey.

Stanolind Oil & Gas Co. 3 C. J. Anderson, in E. Hall Survey, opened a new oil sand for the Whitson pool, Matagorda County. This is a workover well, original discovery well for Whitson. New sand topped at 8,558 ft., with perforations at 8,570-76 ft. for completion. Total depth 10,800 ft. Initial production flowed 182 bbl. of oil per day through a ½-in. choke, gas-oil ratio 737, gravity 38°.

New oil production for Austin County has been indicated at Gulf Oil Corp. 1 Allen Lesikar et al, wildcat in the New Ulm area, in the A. Kuykendall League, 2½ miles east of New Ulm townsite. On test through perforations at 9,608-18 ft., it flowed 85 bbl. of net oil and 3.5 bbl. of basic sediment and water per day through a 3/16-in. choke with 1,725 psi. flowing pressure on the tubing. Total depth is 10,017 ft., with 5½-in. casing set at 10,008 ft.

Sun Oil Co. 1 Robert F. Goehring et al, in the Brandt pool, Goliad County, flowed an estimated 50 bbl. of oil per day on initial production test from the Yegua zone to open a new pay zone for this field. Drill-stem test in the Luling sand recovered salt water. Operator set 5½-in. casing to 4,770 ft., and perforated it below 4,700 ft. for the Yegua completion. This well is in A. Mancha Survey.

The 33 new locations reported for Districts 2 and 3 included 10 wildcat starts, 2 in Fort Bend, and 1 each in Brazoria, Fayette, Gonzales, Jackson, Matagorda, Orange, Refugio and Wharton counties. Two successful wildcats were completed, opening one oil pool in Jackson County, and the new oil pay in Whitson pool, Matagorda County. Three wildcats were dry.

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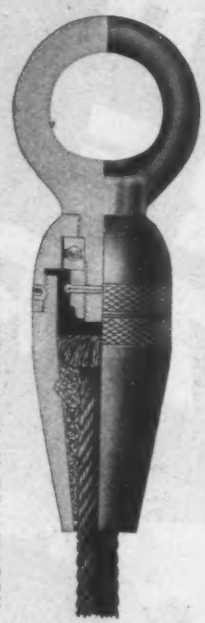

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TEXAS GULF COAST (DISTRICTS 2 & 3) SUCCESSFUL WILDCATS

Jackson County: New oil pool, "Sandy Creek"—Rock Hill Oil Co. 1 J. M. Halamicek, in S. C. A. Rogers, 2 mi. W of Ganado and ½ mi. NW of West Ganado field, top pay 4,557 ft., TD 5,610 ft., perf. 4,560-64 ft., IP: 108 bbl. oil per day through a ⅛-in. choke, GOR 257, TP 525 psi., CP 620 psi., gravity 25°, no water.

Matagorda County: New oil sand, Whitson pool—Stanolind 3 C. J. Anderson, in E. Hall Sur., old well worked over, TD 10,800 ft., top sand 8,558 ft., perf. 8,570-76 ft. IP: 182 bbl. oil per day through ⅛-in. choke, GOR 737, TP 1,350 psi., CP 1,600 psi., 38°-gravity, no water. (Originally the Whitson discovery well).

TEXAS GULF COAST (DISTRICTS 2 & 3) WILDCAT FAILURES

Live Oak County: Earl A. Dillon et al 1 Dodie West McClelland, in Blk. 42, Kittie Block, George West ranch Subd., in Michael Caronican Sur. 35, 5 mi. SE of Three Rivers, dry, TD 2,673 ft.

Refugio County: Seaboard Oil Co. of Del. 1 Power & Woodworth, in Juan & Juan Jose Garcia & Jose Vidauri Grant, 4½ mi. N of Vidauri, dry, TD 6,850 ft.

Wharton County: Lonnie Glasscock 1 R. G. Kelso, in Indianola RR Co. Sur. 20, 1¼ mi. S of Nada gas production, dry, TD 7,100 ft.

APPALACHIAN FIELD

Briery Structure Gets First Clinton Sand Test

PITTSBURGH.—On Briery anticline in Portland district, Preston County, West Virginia, Wm. E. Snee, Orville Eberly et al are deepening the Oriskany test on the Virginia Cuppett farm which, barring drilling difficulties or abnormal faulting, will test the Clinton sand. The surface elevation is 2,137 ft.; Tully lime 4,619 ft., Corniferous lime 5,449 ft., Oriskany 5,628 ft. which has a sustained volume of 300,000 cu. ft. of gas with no decrease while deepening. It will be the first Clinton sand test on the structure.

In Grant district, Jackson County, United Carbon Co. topped the Corniferous lime at 4,874 ft., steel line, in the wildcat on Nathaniel Waterbury farm which from an elevation of 930 ft. places it datum minus 3,944 ft. Casing will be set at 4,884 ft. Located on the Belleville Quad, it is 4 miles south 39 degrees .05 minutes and 0.55 mile west 81 degrees 35 minutes.

On Chestnut Ridge in Georges Township, Fayette County, southwest Pennsylvania, Manufacturers Light & Heat Co. topped the Onondaga lime at 7,100 ft. in 8 Barton and will run casing to 7,123 ft. The Tully lime had been logged at 6,535 ft. presenting a regular interval to the lime.

In Wayne Township, Erie County, northwest Pennsylvania, Pennsylvania Gas Co. topped the Onondaga at 3,150 ft. in the second test on C. J. Follette farm.

New locations in southwest Pennsylvania totaled three and were in Boggs Township, Armstrong County; Red Bank Township, Clarion County; and Allegheny Township, Westmoreland County.

WEST VIRGINIA SUCCESSFUL WILDCATS

Jackson County, Ripley district: Godfrey L. Cabot, Inc., 1,254 Dolly Castro, 1,750,000 cu. ft. gas, elev. 964 ft., Corniferous lime 5,103 ft., Oriskany 5,203 ft., shot 5,204-24 ft., rock pressure 1,400 psi., TD 5,232 ft.

Mason County, Cologne district: Columbian Carbon Co. 993 Goldie Ankrum, 112,000 cu. ft. gas, elev. 671 ft., Injun sand 1,648 ft., Corniferous lime 4,110 ft., shot 2,700-3,650 ft., TD 4,110 ft.

SOUTH LOUISIANA

Gas-Condensate Pool Opened in Pointe Coupee

NEW ORLEANS.—A new gas-condensate pool for Pointe Coupee Parish, 3 miles west of Lottie townsite and 6½ miles northeast of production in Krotz Springs field of St. Landry Parish, has been opened by The Texas Co. 1 Lottie Land & Development Co., 25-6s-8e. Drilled to a total depth of 10,509 ft., this well was completed for an initial production of 62 bbl. of condensate per day and 8,250,000 cu. ft. of gas per day, through a ½-in. choke. Flowing pressure on the tubing was 1,620 psi., and gravity was 53.2°. Production is through perforations at 8,848-62 ft. The company has located a confirmation test, 1 Local Investors, Inc., ¼ mile south of the 1 Lottie Land & Development Co.

A new sand on the west side of the Weeks Island dome, Iberia Parish, has been opened by Humble Oil & Refining Co. 2 R. H. Goodrich et al. This well is producing through perforations at 7,968-76 ft., with total depth in salt at 8,139 ft. On initial test it flowed 138 bbl. of 30.7°-gravity oil and 138 bbl. of salt water per day through a 5/32-in. choke. Locations for 3 and 4 Goodrich were made in the same area. The No. 3 test is drilling at approximately 7,000 ft. The No. 4 is waiting on rig.

Another good well for the Dave Haas field of Avoyelles Parish has been completed by Atlantic Refining Co. Its 1 W. L. Stokes, an easterly offset to the discovery and in Section 10-2s-2e, was drilled to a total depth of 8,656 ft. and oil sands were found at 8,400-15 ft., 8,460-8,515 ft., and 8,570-95 ft., with top of Wilcox at 8,385 ft. Perforations for completion were made from 8,570-82 ft. and the well gaged 211 bbl. of 43°-gravity oil per day through a 10/64-in. choke. Flowing pressure on the tubing was 1,500 psi. and gas ratio 1,070.

Humble Oil & Refining Co. has located a 14,000-ft. wildcat exploration in the Caminada Pass area of Jefferson Parish. This is in the western portion of Caminada Bay, in Lease 799, Tract 1,114, Block 16.

The 10 new locations reported this week included 2 wildcat starts, 1 each in Cameron and Jefferson parishes. One new gas-condensate pool was opened in Pointe Coupee Parish while two new oil pays were opened, one each in Weeks Island in Iberia Parish, and St. Martinville in St. Martin Parish.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

Iberia Parish: New oil sand, Weeks Island—Humble 2 R. H. Goodrich et al, Twp. 14s-6e, top sand 7,968 ft., TD 8,139 ft., perf. 7,968-7,976 ft., IP: 138 bbl. oil per day through 5/32-in. choke, gravity 30.7°.

Pointe Coupee Parish: New gas-conden-

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sate pool—The Texas Co. 1 Lottie Land & Development Co., 25-6s-8e, 3 mi. W of Lottie townsite and 6½ mi. NE of Brotz field production, TD 10,509 ft., top sand 8,848 ft., perf. 8,848-62 ft., IP: 62 bbl. condensate per day and 8,250,000 cu. ft. gas per day through a ½-in. choke, TP 1,620 psi., gravity 53.2°, 2.7 per cent water.

St. Martin Parish: New oil sand St. Martinville-Continental Oil Co. 2 Barras-Isidore Unit, 66-11s-6e, TD 5,109 ft., top sand 4,280 ft., perf. 4,280-94 ft., IP: 90 bbl. oil per day through 8/64-in. choke, gas-oil ratio 300, TP 425 psi., CP 575 psi., gravity 25.8°.

KANSAS

Good Results From Tests In Western Counties

THE STANOLIND OIL & GAS CO. 1 Wheatley, C NE SW 23-33s-31w, about 15 miles east of the Hugoton gas field, has given Seward County new oil production from the Mississippian. On a 20-hour pumping test, the well produced almost 20 bbl. of oil and 7½ bbl. of water per hour through three sets of perforations between 5,815 and 5,915 ft. Casing was set at 5,980 ft. and total depth was 7,340 ft.

In a 1-hour drill-stem test, the Stanolind 1 Bear, NW NW SE 17-32s-40w, a deep Morton County test on the west flank of the Hugoton gas field, had a show of 6,683,000 cu. ft. of gas from 4,990-5,017 ft. in the Pennsylvanian. Drilling is below 5,150 ft. with the test scheduled to go to the Mississippian.

The Anderson-Prichard Oil Co. and Consolidated Gas Utilities Co. 1 Frantz, NE NE NE 35-30s-2w, produced 21 bbl. of oil and 5,000,000 cu. ft. of gas in 12 hours at 3,742-79 ft. in the Mississippi lime after acidizing. This Sumner County well is located near the abandoned Anson shallow pay pool and about 4 miles southwest of the Latta pool.

In Reno County, the connecting link between the Hilger and North Hilger pools may be the Kornfield Brothers and Harper & Olson 1 Terry "A," NW SW NE 4-26s-4w. When the plug was cracked at 4,102 ft., 3,000 ft. of oil rose in the hole. Production is from the Viola.

A top potential rating has been assigned the Nadel & Gussman 1 Marcotte, NW NW SW 26-9s-20w, Rooks County discovery well in the newly named Northampton pool. Production is from the Arbuckle.

Gulf Oil Corp. 1 Bowman, NE NE SW 11-21s-16w, offset to Southwest Ash Creek, Pawnee County, has also been completed with a maximum potential of 3,000 bbl. from the Arbuckle.

There were 41 completions and 52 locations were recorded for the week. Butler County had eight completions and six locations, followed by Barton with eight completions and five locations, and Russell with four completions and six locations.

KANSAS WILDCAT FAILURES

Graham County: Nate Appleman 1 Napue, NW NW SW 11-7s-21w, dry, TD 3,727 ft., anhydrite 1,740 ft., Topeka 3,119 ft., Heebner 3,363 ft., brown Lansing 3,386 ft., white Lansing 3,414 ft., cherty conglomerate 3,658 ft., Arbuckle 3,696 ft., no shows.

McPherson County: Westgate-Greenland & Mallard Drilling 2 Hart, SW SW SW 33-17s-1w, dry, TD 2,717 ft., Lansing 2,120 ft., Mississippian 2,685 ft.

Rice County: Nadel & Gussman 1 Schulty, NE NE NE 25-18s-10w, dry, TD 3,260 ft., Kansas City 2,871 ft., conglomerate 3,188 ft., Arbuckle 3,212 ft.

Russell County: Ben Brack Oil Co., Inc., 1 Letsch, SE SE NW 15-13s-12w, dry, TD 3,420 ft., anhydrite 704 ft., Topeka 2,600 ft., Heebner 2,876 ft., Lansing 2,985 ft. with show of oil, conglomerate 3,327 ft., Arbuckle 3,378 ft.

Great Lakes Carbon 1 Harry Krug, NW NW SE 10-13s-14w, dry, TD 3,350 ft., anhydrite 845 ft., Tarkio 2,438 ft., Topeka 2,652 ft., Heebner 2,935 ft., brown Lansing 2,955 ft., Arbuckle 3,285 ft.

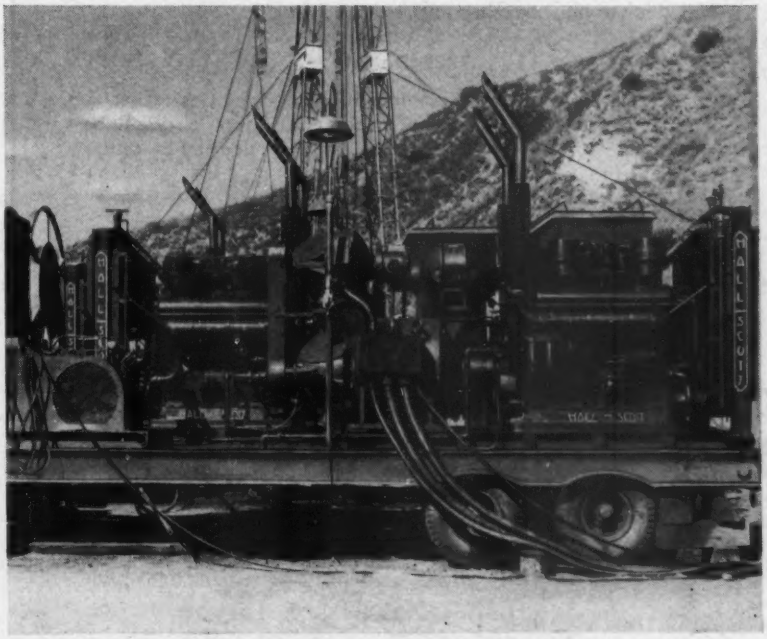
PERMIAN BASIN

Pecos Well Shows Oil And Gas But Is Deepening

MIDLAND.—In Pecos County, 2 miles west of Pecos Valley Shallow field, C. W. Chancellor, Slick Oil Co. et al 1 Thornton Davis found its first crude oil, and apparently entered the water table, in testing to 9,680 ft. A 2-hour test between 9,615-80 ft. brought gas to the surface in 3 minutes, showing an increase over previous flows and now estimated at 3,000,000 cu. ft. a day, and recovered 35 ft. of 42°-gravity oil, plus 135 ft. of 58°-gravity distillate and 1,900 ft. of sulfur water. Operators were deepening, and according to reports, would halt at 9,735 ft. for another test. Reports that El Paso Natural Gas Co. planned to lay a pipe line to the Pecos area were not confirmed.

Earlier in the week the 1 Davis made a 2-hour drill-stem test between 9,550-9,615 ft. Gas flowed in 3½ minutes, yielding an estimated 2 to 4 bbl. of distillate an hour. The well indicated additional pay to 9,725 ft., but a test between 9,675-9,725 ft. failed due to mechanical difficulties. On the test to 9,615 ft. there was some recovery of salt water, but observers expressed the opinion it was connate water.

Unconfirmed reports on Amon G. Carter 1 Carter fee, central Winkler County wildcat, said a drill-stem test between 12,049-12,558 ft., presumably in the Ellenburger, recovered the water blanket and salt water with a slight show of gas, but no



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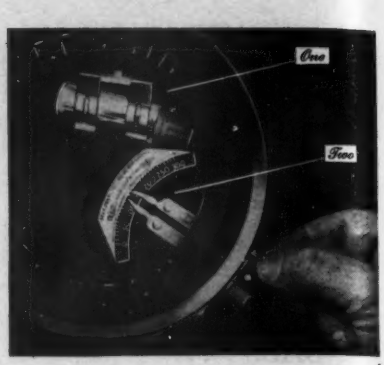

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shows of oil. Location of the test is 8 miles east and a little south of Kermit.

Anderson-Prichard Oil Corp. and Vickers Petroleum Co., Inc., 1 Foster, southeast Sterling County wildcat, ran a 1-hour drill-stem test at 4,868-5,032 ft., recovering 75 ft. of drilling mud, with no shows of oil or gas. The interval tested has been tentatively identified as the Wolfcamp. It was drilling ahead to the Ellenburger.

Plymouth Oil Co. has given the Ellenburger up as dry in its 1 Collins, north-central Sterling County wildcat, and will test shows of oil in the Strawn section. Plugged-back total depth is 8,260 ft. The well had been swabbed for 3 bbl. of oil an hour from the Ellenburger at 8,316-85 ft., but after shooting and treating, it produced mostly water.

Cities Service Oil Co. 1 Claude Collins, 4 miles north and 2 miles west of Iolanthe, Sterling County, was to run casing to bottom at 8,184 ft., in an attempt to shut off water. The well had top of the Ellenburger at 8,142 ft., 5,727 ft., subsea, and recovered salty sulfur water on a drill-stem test between 8,142-62 ft. Sulfur water taken from the drill pipe was cut 10 to 20 per cent with oil, and the bottom 2,270 ft. of water was cut approximately 50 per cent with oil. Operator expressed the opinion there was about 10 ft. of oil pay above the water zone. After the test, more sulfur water was encountered in deepening to 8,184 ft., with no further shows of oil.

West Texas operations were down last week, with 27 oil wells, 1 gas and 6 dry holes making up the week's 34 completions. In Dawson County, Seaboard Oil Co. of Delaware 6-E-A J. H. Robinson, deep test in the Spraberry field, was a failure at 11,136 ft. in dolomite. The following formation tops were reported: San Andres 3,470 ft., Clear Fork 6,443 ft., Pennsylvanian limestone 7,715 ft., Mississippian 10,255 ft., and the Ellenburger 10,596 ft., on an elevation of 2,917 ft.

WEST TEXAS (DISTRICTS 7-C AND 8) WILDCAT FAILURES

Howard County: Russell Maguire 2 Fryar, Sec. 4, Blk. 33, T&P Sur., 8 mi. NW Big Spring, dry, TD 3,208 ft. in lime, show of gas 3,165 ft.

Pecos County: E. E. Barrett 1 Lowery & Wilson, Sec. 1, Blk. 194, GC&SF Sur., 10 mi. NW Iraan, dry, TD 1,509 ft., bailed 17 bbl. oil a day after shooting at 1,395-1,410 ft. declining to 3 bbl. a day after second shot.

Reagan County: Moore Exploration Co. 1-B University, Sec. 12, Blk. 12, 6 mi. S Big Lake, dry, TD 2,599 ft., no shows.

SOUTHEASTERN NEW MEXICO

HOBBS.—Vickers Petroleum Co., Inc., 1 Stanolind-State, 14-16s-32e, 4 miles north of the West Roberts field in Lea County, reported oil stains and saturation from 4,627-4,715 ft. Operators were preparing to test the section.

Barnsdall Oil Co. 9 Alaska Cooper, Section 12-20s-36e, deep operation in the Monument pool, was drilling below 10,190 ft. in Simpson lime and shale, topped at 10,120 ft.

Gulf Oil Corp. 6 La-Munyon-Federal, Section 28-23s-37e, McKee zone prospect, 10 miles south of Eunice, was drilling below 9,889 ft. in Ellenburger, where water was encountered at 9,800 ft. The well gaged 88 bbl. of oil in 2½ hours from the McKee at 9,433-9,507 ft.

Culbertson & Irwin, Inc., 1 Murray, Section 9-22s-32e, southwest Lea wildcat, has been abandoned at 5,035 ft. in Delaware, topped at 4,870 ft. Elevation is 3,814 ft.

SOUTHEAST NEW MEXICO SUCCESSFUL WILDCAT

Lea County: Magnolia Petroleum Co. 1-A Santa Fe, SE SE 30-9s-38e, 4½ mi. N Ranger Lake, pumped 15.5 bbl. oil and 10.8 bbl. salt water, San Andres 4,832-40 ft., TD 4,840 ft., 28° gravity, elev. 4,070 ft.

TEXAS PANHANDLE (DISTRICT 10) SUCCESSFUL WILDCAT

Sherman County: Shamrock Oil & Gas Co. 1 Pryor, 2 mi. E of W line and ½ mile N of S line of county, TD 3,393 ft., PB 3,332 ft., gas pay 3,215-3,305 ft., gaged 8,500,000 cu. ft. gas a day, top dolomite 3,133 ft., elevation 3,727 ft.

OKLAHOMA

Two Good Oilers Testing In Stephens County

IN the Velma pool, the Carter Oil Co. 5 Riviere, SW SW SE 10-1s-5w, with plug-back depth of 5,452 ft., flowed 314 bbl. of 38.2°-gravity oil through ¾-in. choke in 6 hours with a gas-oil ratio of 1,850 to 1.

Stephens County has another good well testing in the Sholem-Alechem field. Stanolind Oil & Gas Co. 3 Godwin, NE SE NW 2-1s-4w, swabbed 451 bbl. of oil in 10 hours from perforations at 4,790-4,850 ft. and was to set tubing. The plug-back depth is 5,127 ft.

Gulf Oil Corp. 1 Foster, NW NW SW 4-9n-7e, in the Cheyarha area in Seminole County, after finding no production in the Booch sand, was drilled deeper to the Gilcrease. A drill-stem test at 3,560-80 ft. resulted in an oil flow at the rate of 40 bbl. per hour. The well will be cored still deeper before casing is set.

In Garvin County, the Magnolia Petroleum Co. found Bromide production and extended North Antioch pool, at the 1 Cooper, NW SE SE 9-3n-2w. The Bromide was topped at 6,235 ft. and a 1-hour drill-stem test at 6,296-6,355 ft. had gas in 3 minutes and oil in 11 minutes. The well flowed 37.5 bbl. of oil in 40 minutes with a gas-oil ratio of 1,700 to 1.

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Oil Co. 1 Sheets, SE SW NW 30-12n-7e, has given the Garden Grove pool in Okfuskee County its fourth pay zone. The well was completed for 150 bbl. per day after perforating opposite the Hunton at 4,250-75 ft.

OKLAHOMA SUCCESSFUL WILDCATS

Caddo County: Magnolia 1-A Miller, SE NW NE 14-6n-9w, 195 bbl. of oil per day from 10,630-55 ft., through ¼-in. tubing choke, TD 13,046 ft.

Stephens County: Magnolia 1 Crews, SW NE NE 12-1s-4w, pumped 8 bbl. of 30°-gravity oil per day from sand at 3,480-99 ft., TD 5,806 ft.

OKLAHOMA WILDCAT FAILURES

Creek County: Sherrod 1 Kimble, SW NE NE 21-14n-10e, dry, TD 3,456 ft. Viola 3,386 ft., dolomite 3,417 ft., Wilcox 3,447 ft.

Garvin County: Continental 1 Cox, SW SW NE 18-2n-3e, dry, TD 1,935 ft., Pennsylvania sand 1,696 ft., Arbuckle 1,872 ft.

Hughes County: Keating 1 Harjo, SE NE SE 23-7n-8e, dry, TD 3,732 ft., Allen sand 1,470-95 ft., Bartlesville 2,444-70 ft., brown lime 2,540 ft., Upper Gilcrease 3,100 ft., Wapanucka 3,520 ft.

Wendell 1 Buck, SW SW NE 20-9n-10e, dry, TD 307 ft., sand 292-306 ft. with slight show of oil.

Kay County: Jones 1 Jehle, NW NW SE 6-28n-2w, dry, TD 4,934 ft., Wilcox 4,746 ft., no second Wilcox.

Lincoln County: Amerada 1 Tipton, NW NW NW 13-14n-5e, dry, TD 4,480 ft., Prue 3,301 ft., Hunton 4,398 ft., Sylvan 4,462 ft.

Kingwood 1 Betow, SW SW NW 10-15n 3e, dry, TD 3,718 ft.

Okfuskee County: Berry 1 Whitlow, C NE SW 36-10n-12e, dry, TD 3,211 ft., Wapanucka 2,836-90 ft., Union Valley 3,060 ft., Cromwell 3,106 ft., Lower Cromwell 3,197 ft.

Oklahoma County: Double R 1 Rogers, SW SW NE 18-14n-1e, dry, TD 5,765 ft., Pawhuska 3,131 ft., Hogshooter 4,070 ft., Oswego 4,854 ft., Hunton 5,402 ft., Wilcox 5,644 ft., second Wilcox 5,731 ft.

British-American 1 Belle Isle Unit, NE NW SW 8-12n-3w, dry, TD 6,940 ft., Bartlesville 6,452 ft., Wilcox 6,720 ft., second Wilcox 6,841 ft.

Pawnee County: Mulberry 1 Nichols, NW NW NW 12-20n-5e, dry, TD 3,236 ft.

Pontotoc County: Maguire 1 Roberts, SW NE SW 33-4n-8e, dry, TD 3,668 ft., Booch 1,590 ft., Hartshorne 1,805 ft., Atoka 1,885 ft., Wayanucka 3,354 ft., first Cromwell 3,362 ft., second Cromwell 3,589 ft., Caney 3,665 ft.

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CANADIAN FIELDS

First Dry Hole Breaks Year Record in Leduc

CHATHAM.—First break in the year-long succession of successful completions by Imperial Oil Co. in Leduc field, Imperial 34, LSD 9, 9-50-26w4, in the south end of the field, is being abandoned after drill-stem test at 5,414-29 ft., gave 1,600 ft. recovery of mud and salt water. The well topped the D-3 zone at 5,427 ft. Location was ¼ mile south of Imperial 2, a D-3 producer, and ¼ mile north of East Leduc-South Brazeau 1, which got production just above the water line in the same zone.

Imperial 33, LSD 2, 21-50-26w4, finished at 5,110 ft. as a D-2 producer, a 1-hour drill-stem test at 5,016-90 ft. showing 73,000 cu. ft. maximum gas flow, followed by commercial oil.

Imperial 35, LSD 11, 19-50-26w4, in drill-ste mtest of D-1 zone at 4,305-25 ft., showed 135,000 cu. ft. gas with recovery of 30 ft. oil-cut mud and 90 ft. of black 18°-gravity oil. A later test at 4,325-35 ft. showed a little gas and 50 ft. of black oil with 180 ft. salt water.

In the main field, four new wells are in definite production. Atlantic Oils 2, LSD 14, 23-50-26w4, at 5,356 ft. had 174 bbl. daily through 12/64-in. choke. Imperial 26, LSD 4, 22-50-26w4, at 5,120 ft. had 151 bbl. through 11/64-in. choke. Imperial 27, LSD 1, 28-50-26w4, at 5,031 ft. is making 68 bbl. on 9/64-in. choke. Imperial 28, LSD 6, 21-50-26w4, at 5,100 ft. started with 169 bbl. on 12/64-in. choke.

Several other wells are in various stages of testing. Globe-Leduc West 8, LSD 10, 34-50-26w4, completed at 4,928 ft. has oil in the D-2 zone and is trying to build up gas pressure. Home-Leduc 3, LSD 14, 21-50-26w4, has completed successful drill-stem tests at 5,337 ft. but is deepening in the D-2 before taking production. Atlantic Leduc 3, LSD 12, 23-50-26w4, is trying to recover circulation at 5,267 ft. before deepening to production level in the D-3.

Continental-Leduc 1, LSD 2, 9-50-26w4, in the south end of the field, finished at 5,410 ft. just above the water line, has been testing 133 to 160 bbl. on daily runs. This company is starting two other south-end tests, Continental 8, LSD 11, 7-50-26w4, and Continental 11, LSD 6, 5-50-26w4.

North and east of the field, East Leduc 2 outpost test, LSD 10, 5-51-25w4, finished in green shale at 5,492 ft. apparently outside the easterly rim of the coral reef barrier, and has been abandoned. A new outpost test south of the field, Okalta-Leduc 2, LSD 10, 33-49-26w4, has spudded.

Woodbend.—In the northwesterly extension of Leduc field, Imperial-Woodbend 1, LSD 5, 15-51-26w4, D-3 producer, showed a flush of 2,230 bbl. after perforating at 5,308-18 ft. with 28 shots. It has been placed in steady production, making 150 bbl. with tight choke. Imperial-Woodbend 2 has been located ¼ mile south, in LSD 4, 15-5-26w4, and Imperial-Woodbend ¼ mile northwest in LSD 9, 16-51-26w4. No. 1 production is

trucked to railhead pending extension of the Leduc-Nisku pipe line.

Pincher Creek.—Definite production test is now in progress of the wet gas flow in Gulf Canadian-Pincher Creek 1, LSD 15, 24-3-29w4. Location is in the southern Alberta foothills between Waterton Park and Pincher Creek. Bottoming at 11,927 ft. with casing set at 11,755 ft. the well last December showed 10,000,000 cu. ft. gas from the Madison limestone with some light oil and bottom-hole pressure in excess of 5,000 lb., the highest ever recorded in Alberta.

Athabaska.—Flank Petroleums, sponsored by Calgary and Edmonton interests, has spudded a test in LSD 2, 15-62-23w4, in the Rochester section of the Atahabaska district. The well will test a 20,000-acre crown reservation and is located 60 miles north of Edmonton and 2 miles south of Decalta Petroleums 1, LSD 2, 27-63-23w4, at Perryvale, now standing at 2,717 ft. In the same general area, Northern Extension is drilling a series of structure tests to the Belly River-Labiche shale contact, preparatory to commercial development.

Stimson Creek.—In the Stimson Creek section of the Alberta foothills south of Turner Valley, Socony-Vacuum 1, LSD 12, 5-15-2w5, got Madison limestone around 3,462 ft. and is deepening below 4,000 ft. with no change in formation.

Lloydminster.—In the Alberta section of the Lloydminster field, Command-Lloydminster 4, LSD 10, 16-50-1w4, finished at 1946 ft. with 15 bbl. daily initial production. Yorkton 4, LSD 7, 16-50-1w4, at 1,946 ft. had 40 bbl. initial.

CALIFORNIA

Big Play Opened In Athens Area

LOS ANGELES.—Interest in the Athens area of Los Angeles County has increased considerably during the past two weeks due to the excellent performance of Shell Oil Co.'s discovery there. The 1 Mosier Community, 12-3s-14w, completed 2 weeks ago for a reported 700 to 800 bbl. daily, currently is flowing at the rate of approximately 230 bbl. daily through a 15/64-in. choke. Gravity of the oil is 31.7°, and water cut is 2.8 per cent. The well was drilled to a total depth of 9,013 ft. and then plugged back to 8,850 ft. for completion, with 7-in. casing set at 8,010 ft. This well is believed to constitute a ¼-mile northwest extension of a field discovered by Shell several months ago. Future development work, however, may prove the two wells to be an extension of the Athens-Rosecrans field to the southeast.

Current interest in the area is evidenced by high bonuses offered by companies for leases. Some of these offers are said to be as high as the equivalent of $240 per acre for town lots in a community lease. Southern California Petroleum Corp. has announced that it has secured a lease on a 20-acre parcel owned by San Cayetano Land & Exploration Co. in the area. This parcel is just east of the 1 Mosier Community and is in line for development in the horizon opened by this well.

Cleveland Oil Co. has programmed four additional wells to test the possibilities of substantial production from Eocene sands in the old Bardsdale field of Ventura County. The field, discovered in 1891, has been known to be productive from the Eocene for the past 10 years. Low permeability of the Eocene sands, however, has discouraged extensive development in this horizon until recently. Possibilities of production from the Eocene were considerably enhanced 2 weeks ago by completion of Cleveland Oil Co. 3 Elkins, 7-3n-19w, for 350 bbl. daily of 30°-gravity oil through a 26/64-in. choke. As a result, Cleveland has scheduled the new four-well program and has already spudded in the first of these,

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the 1 Burson. This test is located on a 40-acre tract in Section 7-3n-19w, ¼ mile north of the 3 Elkins, and is designed as a deep test to explore the Eocene sands. It is scheduled for completion in the Sespe, however.

CALIFORNIA SUCCESSFUL WILDCATS

Kern County, Kern Bluff area: Shell Oil Co., Inc., 2 Wells-McGregor, 7-29s-29e, pumped 87 bbl. daily, gravity 15.5°, water cut 0.5 per cent, elev. 759 ft., 8⅝-in. casing 840 ft., TD 915 ft.

Santa Barbara County, Zaca area: Tide Water Assoc. Oil Co. 135 Luton, 29-8n-31w, pumped 200 bbl. daily, gravity 26.0°, water cut 28.0 per cent, elev. 985 ft., 9⅝-in. casing 4,268 ft., TD 5,301 ft.

CALIFORNIA WILDCAT FAILURES

Kern County, Carneros Creek area: Independent Exploration Co. 2-29 Anderson, 29-28s-20e, dry in gray sand, elev. 1,127 ft., Carneros sand 1,952 ft., Phacoides 2,782 ft., Kreyenhagen 2,863 ft., Point of Rocks 3,041 ft., TD 3,079 ft.

McKittrick area: Barnsdall Oil Co. 1 Leutholtz, 22-30s-22e, dry, elev. 940 ft., Oligocene 4,473 ft., TD 6,547 ft.

Los Angeles County, East Los Angeles area: Richfield Oil Corp. 1 U. S. Rubber, 16-2s-12w, dry, elev. 157 ft., TD 8,980 ft.

Newhall area: Mutual Development Corp. 1 Lassalle, 10-3n-16w, dry in Mint Canyon, elev. 1,500 ft., TD 8,038 ft.

North Del Valle area: British-American Oil Prod. Co. 1 Kinler-So. Cal., 16-4n-17w, dry, elev. 1,265 ft., TD 6,857 ft.

Monterey County, San Ardo area: Jergins Oil Co. and North American Consol. Oil Co. 1 McCool, 27-22s-10e, dry in granite, elev. 650 ft., TD 2,110 ft.

San Louis Obispo County, Cuyama Valley area: F. R. Anderson et al 1 Hadley, 25-11n-28w, dry in gray sand, elev. 1,791 ft., Cuyama sand 1,840 ft., no oil sand logged, TD 1,701 ft.

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EASTERN TEXAS

Magnolia Well Shows for A Distillate Producer

DALLAS. — Magnolia Petroleum Co. 1 R. W. Fair, Schofield Survey in Smith County, was showing for a distillate producer from perforations between 9,512-72 ft., in the Rodessa. Flowing through ¼-in. choke, on a flowing pressure of 1,340 psi., it gaged 1,630,000 cu. ft. of gas a day. Shut in 4 hours, tubing pressure increased to 2,100 psi., at which time it was allowed to flow into pits for 5 hours. The amount of distillate recovered was not disclosed, and flowing tubing pressure was 1,100 psi. at the end of the 5-hour period. A 7-hour flow, through ¼-in. choke, recovered 23 bbl. of yellowish green distillate and 3 bbl. of water. Beginning tubing pressure was 1,125 psi., and ending was 1,130 psi. Gravity of the oil was around 54°.

In Blackfoot field, Anderson County, The Texas Co. completed its 1 Broadway for 40 bbl. of oil a day in the Rodessa section at 8,972-92 ft. It found the Pettit formation dry. Texas 1 Barnard, which also found the Pettit dry, was planning to drill ahead to contract depth of 9,900 ft., then plug back to test Rodessa porosity indicated while drilling at 9,810-50 ft. On a drill-stem test between packer at 9,820 ft. to total depth of 9,850 ft., it recovered 3,000 ft. of water cushion, 180 ft. of slightly gas-cut mud, with no shows of oil or salt water.

In Cass County, Shell Oil Co., Inc., 1 Smith was drilling below 10,740 ft. in Smackover topped at 10,682 ft., after drill-stem testing between 10,689-725 ft. In 45 minutes ie recovered 180 ft. of salt water, with no shows. Shell 1 Lumpkin, Kaufman County deep test, was drilling in the Smackover at 10,567 ft.

Crude-oil production on the west flank of Waskom field in Harrison County was reported this week at LaGloria Corp. 1 Smith & Lindsey, Holloway Survey. From perforations in the Rodessa, which had previously yielded wet gas, the well made completion potential of 56 bbl. of 42.3°-gravity oil a day through ¼-in. choke. Perforations were placed at 4,930-65 ft.

Additional tests on the Harrison County side of Longwood field were announced this week. Both Sells Petroleum Co., Gladewater, Tex., and Phillips Petroleum Co. are reported to be active in the area, with Sells taking farmout acreage from Phillips. Wells to be drilled in the immediate future include Sells Petroleum Co. 1 Mrs. Mattie Boynston, John McMillan Survey, east offset to Sells Petroleum and Arrow Drilling Co. 1 Allen, which found good production in the Travis Peak. Second proposed test is the Sells 1 W. L. Rudd, William Grouch Survey, ½ mile south of 1 Boynton. Third test is 1 T. J. Taylor, Thomas Anderson Survey, 1 mile southeast of 1 Allen.

At this time the only activity reported in the area is Phillips 1 Rudd, which was drilling below 6,085 ft., in the Travis Peak. Cores around 6,032 ft. recovered 8 ft. of sand having odor and a slight stain.

Ten completions in East Texas included six development wells and four wildcat failures. In Harrison County, Arrow Drilling Co. and Sells Petroleum Co. completed their 1 Mrs. Fannie Allen, D. M. Evans Survey, 2 miles southwest of Wilson Oil Co. 1 Hearne in the new Longwood field, for a daily potential of 148 bbl. of 42°-gravity oil a day, flowing through ¼-in. tubing choke. Production is from the Travis Peak at 6,093-6,105 ft. Ten new locations were reported during the week: Wood County three, Hous-

ton County three, and one each for Anderson, Hopkins, Rusk and Smith counties.

EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURES

Bowie County: Morris Coats 1 S. H. Hall, ½ mi. NE College Hill, Bowie CSL Sur. 50, dry, TD 8,085 ft., Nacatoch 620 ft., Georgetown 3,150 ft., Paluxy 3,523 ft., Glen Rose 3,937 ft., Massive anhydrite 4,870-4,990 ft., Buckner 7,760 ft., Smackover 8,010 ft., elevation 375 ft.

Henderson County: W. B. Hinton 1 D. W. Thornton, Isaac Greeson Sur., 1½ mi. NW Cross Roads, dry, TD 8,628 ft., Woodbine 4,107 ft., Red beds 4,289 ft., Georgetown 4,937 ft., Paluxy 6,275 ft., Massive anhydrite 7,641-7,797 ft., Travis Peak 8,585-8,625 ft., by samples; Pettit 8,414 ft., Travis Peak 8,616 ft., by electric log, elev. 342 ft.

Upshur County: W. W. Bradley 1 Dailey Estate, A. Lumbrera Sur., 1 mi. SE Gilmer, dry, TD 4,050 ft., no shows.

Wood County: B. B. Orr 1 J. D. Harris, J. B. Chirend Sur., 3 mi. NE Oak Grove, dry, TD 5,726 ft., Pecan 2,942 ft., Woodbine 5,290 ft., by samples, elev. 437 ft.

N. CENTRAL TEXAS

Chico Offsets Produces; New Wildcat Located

WICHITA FALLS.—Cities Service Oil Co. confirmed production in an offset test at Chico field, Wise County, this week, and a new wildcat made location southeast of the discovery.

Cities Service 1 Flowers, in the Thompson Survey and a west offset, flowed 225 bbl. of oil in 24 hours, from perforations in the conglomerate at 5,195-5,212 ft. Previously, the well swabbed 32 bbl. of fluid in 12 hours, testing about 85 per cent oil, 10 per cent mud, and the balance acid water, following a 500-gal. treatment through the above perforations. After retreating with 2,000 gal., the well kicked off to flow 115 bbl. of oil, plus 30 bbl. of mud and water, over an undisclosed period. No formation water has been reported.

The new Wise County test is Mid-Continent Petroleum Corp. 1 Kraker, 25 ft. south and 256 ft. east of the northeast corner of the Cochran and Collins Survey, but in the Samuel Wood Survey, A-897, and about 4 miles south and east of Chico field. R. C. Lipscomb is the drilling contractor and permit is to 7,500 ft.

A fourth pay for Sherman field of Grayson County has been opened by Standard Oil Co. of Texas 2 Head, J. Jennings Survey, to flow 176 bbl. of oil in 24 hours. The new sand zone, not yet identified, was from 4,361-73 ft. The well made its test flow through ¼-in. choke on tubing. Standard 1 Rising, J. B. McAnair Survey, which recently opened a new pay in the same area, will be deepened to the sand section being produced by the same company's Head, which completed for 256 bbl. of oil a day between 3,298-3,306 ft. The 1 Rising was originally finished at 3,219-64 ft., for 116 bbl. of oil a day. Standard 1 Kreager, north outpost to the area, in the Alexander and Richards Survey, had shows of oil between 5,112-5,470 ft. in broken sand and chert, but recovered salt water on drill-stem tests. It was drilling ahead below 5,475 ft. on last report.

Renewed activity in the Ranger limestone area southwest of the old Desdemona field, and 2 miles east of Gorman, in Comanche County, was promised when R. W. McKissick et al 1 R. L. Westmoreland bailed from 2-3 bbl. of oil and hour from 2,798-2,802 ft. Operators shut down to run casing, after which the section will be shot. Location is in the William DeMoss Survey, and about ½ mile southwest of production at Kirk & McKissisk 1 Meyers, which was completed last month.

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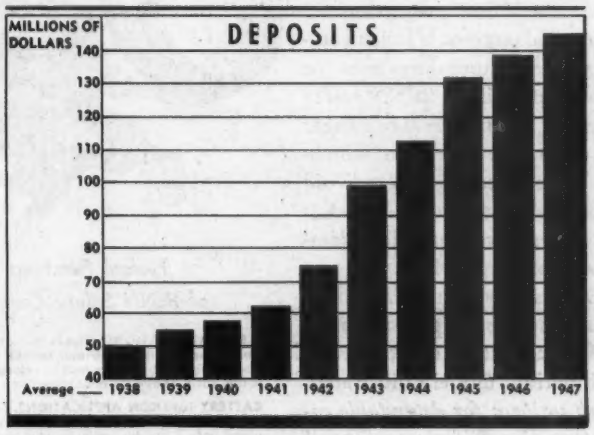

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North Central Texas had 60 new locations during the week. By counties they were: Archer 10, Wichita 9, Young 7, Clay 6, Cooke 4; Montague, Coleman, Jones and Wilbarger 3 each; Jack, Stephens and Taylor 2 each; Grayson, Eastland, Haskell, Throckmorton and Wise 1 each. Completions during the week for North Texas (District 9) were 9 oil wells, 1 gas and 10 dry, with the majority of work reported from Archer and Clay counties. In West Central Texas (District 7-B), 10 oil completions and 6 dry holes made up the week's total. In that area, Throckmorton County was the most active, with six oil wells finished, and two wildcat failures.

NORTH CENTRAL TEXAS (DISTRICTS 7-B AND 9) SUCCESSFUL WILDCATS

Eastland County: Bailey Griffin et al 1 C. M. McClelland, Sec. 463, SPRR Sur., NW cor. of county, pumped 50 bbl. 40°-gravity oil a day, Caddo 3,635-50 ft., TD 3,671 ft.

NORTH CENTRAL TEXAS (DISTRICTS 7-B AND 9) WILDCAT FAILURES

Clay County: W. H. Hammon 1 T. E. Ruddy, Blk. 9, Kemp & Newby Subd., Cherokee CSL Sur., 5 mi. E Wichita Falls, dry, TD 6,082 ft.

S. D. Johnson 1 L. M. Peden, Blk. 4, T. J. Belcher Subd., 1½ mi. N Deer Creek, dry, TD 6,174 ft.

Phillips Petroleum Co. 1 Bryant Edwards, Sec. 7, T&NO Sur., 5 mi. SE Henrietta, dry, TD 6,856 ft., Caddo 6,006 ft., Ellenburger 6,522 ft.

Coleman County: John R. Less et al 1 Tom Landrum, Sec. 66, GH&H Sur., 3 mi. SW Valera, dry, TD 3,202 ft., sand with show of oil 2,689-2,709 ft., Capps lime 2,709 ft., Caddo 3,102 ft.

Eastland County: British-American Oil Producing Co. 2 J. W. Courtney, Sec. 41, Blk. 4, H&TC Sur., 5 mi. NW Eastland, dry, TD 2,585 ft., Strawn sand 2,560 ft., had show of oil and gas.

Stephens County: Star Oil Co. 1 J. F. Lenoir, Blk. 4, G. C. Peveler Sur., 7 mi. S Woodson, dry, TD 4,863 ft., Caddo 3,738 ft., Mississippi 4,543 ft., Ellenburger 4,768 ft., elev. 1,175 ft.

Throckmorton County: Bridwell Oil Co. 1 J. C. Irwin, Sec. 1, SPRR Sur., 11 mi. S Throckmorton, dry, TD 5,024 ft., Caddo 4,210 ft. with show of oil, Mississippian 4,692 ft., Ellenburger 4,907 ft.

Cities Service Oil Co. 1 J. B. Matthews, Blk. 89, Comanche Indian Reservation, 9 mi. SW Throckmorton, dry, TD 5,208 ft., Mississippi 4,825-75 ft., Ellenburger 5,152 ft.

Wichita County: Akin & Dimock 1 J. C. Murphree, Sec. 1, SA&MG Sur., 6 mi. W Iowa Park, dry, TD 4,122 ft., Ellenburger 4,058 ft.

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OHIO, KENTUCKY

Important Extension Made to Dover Pool

COLUMBUS.—An important north extension of nearly a mile to the Dover pool was completed by Frank Brendel et al on G. J. Lab, Section 24, Lawrence Township, Tuscarawas County. White Clinton at 4,807-39 ft. gaged 3,300,000 cu. ft. of gas with a light showing of oil at 4,826 ft. The company has a block of acreage and will probably develop it in an orderly manner.

Four Way Oil & Gas Co. 2 John Scotfield, Section 24, Hopewell Township, Perry County, extends the proven area ½ mile to the northeast. Clinton at 3,072-3,113 ft. had a nice show of oil and gas and flowed 65 bbl. in 24 hours after shot. In Bearfield Township, Thompson & Hicks 2 L. G. Sims, Section 23, topped the Clinton at 3,832 ft. and finished at 3,867 ft., still in sand, with 1,500,000 cu. ft. of gas with 1,085 lb. rock pressure.

A small well was completed along the south edge of the Frazier pool in Brush Creek Township, Muskingum County, Ohio Fuel Gas Co. 2 Russell Longshore, Section 15, drilled through the Clinton at 3,692-3,737 ft. with 520,000 cu. ft. of gas. The well will be shot later.

Small et al have started to drill their wildcat on C. M. Smith in Section 35, Tuscarawas Township, Stark County.

Nine counties reported a total of 15 locations. Stark, Muskingum, and Perry each had three, and the others one each. Lancaster and Brush Creek fields led in completions with 4 wells each out of a total of 15.

EASTERN KENTUCKY

ASHLAND.—Three completions were reported in the Eastern Kentucky field of operations during the week by Kentucky-West Virginia Gas Co., one producing in two different phases.

Well 868, Wilson Short property, Knott County, was completed at 2,934 ft., with 103,000 cu. ft. of gas in shale, A.S.

Well 5769, John H. Auxier, Johnson County, was completed at 2,862 ft., with 133,000 cu. ft. in Big 6 and Corniferous, and 15,000 in Corniferous.

Well 5778, Lee Hall property, Knott County, in at 1,953 ft., brought 286,000 cu. ft. in Maxon.

Two dry holes were also noted, Well 5777, John P. Wells, Martin, 3,046 ft., and Well 5780, James Conley, Magoffin, 2,196 ft.

WESTERN KENTUCKY

OWENSBORO.—Two producers were completed in Daviess County last week. The Sohio Petroleum and Chester Oil 1 L. C. Hayden, 8-N-27, had an initial production of 45 bbl. per day from the Benoist sand at 1,798-1,815 ft. after a shot of 80 qt. The

J. C. Ellis 6 J. Ward, 1-N-31, was completed in the Waltersburg for an initial production of 6 bbl. per day.

The Sohio Petroleum 1 J. T. Hayden, 12-N-27, McLean County, had an initial production of 30 bbl. per day from the Benoist at 1,802-11 ft. The well was shot with 40 qt.

INDIANA

EVANSVILLE.—In the area just north of the Vienna field and about 7 miles northwest of Evansville in Vanderburgh County, the H. L. Cokes and George & Wrather Drilling Co. 1 W. Heneisen, SW SW NW 19-5s-11w, on a drill-stem test got gas in 30 minutes and clean oil in 45 minutes. Casing will be set to test the excellent oil saturation in the Aux Vases at 2,618-29 ft. The well has been drilled to 2,775 ft.

In Posey County, the B. M. Heath 6 Allen Gray Estate, SE NW SW 36-7s-15w, was completed for an initial production of 100 bbl. per day from the Waltersburg. Also in Posey County, the Sinclair Wyoming Oil Co. 19 Elmer Elliott, 14-5s-14w, was completed in the Hardinsburg for 40 bbl. per day.

ROCKY MOUNTAIN

New Area Opened Between Two Mush Creek Pools

DENVER.—Continued successful completions in the Mush Creek area of Weston County, Wyoming, along the east side of Powder River basin, indicate that production from this pool may be more extensive than originally estimated. Casing is now being run at an extension test 3½ miles northwest of the closest producer at Sierra Petroleum Co.-Texas Co. 1 Magee, C SE SW 27-45n-64w. This well found the Newcastle at 4,655-67 ft. and electric log of the sand section indicated favorable production prospects.

Another good producer for the field was completed last week by Mush Creek Production Co. at 3 State, NE SW SE 16-44n-63w. This well flowed 750 bbl. of oil in 13 hours and 40 minutes from Newcastle between 4,105-28 ft., with total depth at 4,176 ft. It was reported that this well had a total of 23 ft. of sand, almost twice as much as the majority of wells heretofore completed in the field. The well opens a new producing area between the two Mush Creek pools, and added drilling is expected in the immediate vicinity as a result of the good completion. One-half mile southwest of this new well The Texas Co. has installed pump at 1 Updike and the well is reported to have pumped and flowed 54 bbl. of oil on 5-hour test.

There is now a total of 24 producing wells at Mush Creek with 15 locations and drilling wells in the field. Shallow, compartively inexpensive drilling, combined with some excellent completions in this area, has caused considerable interest by operators heretofore not active in the Rocky Mountain area. Acreage ownership is diversified, with the result that a more active drilling campaign is expected in the area during the coming year. Drilling costs are now reported at between $4.50 and $5 per foot.

The oil is 42°-gravity, light, green crude, bringing a field price of $2.85 per barrel with approximately 2,000 bbl. of oil daily now being produced. The majority of the crude has been processed in Carter Oil Co. and Graco Refining Co. plants at Newcastle, 12 miles northeast, and trucking charges have been approximately 15 cents per barrel. A pipe line is now being constructed from the field to Newcastle, and application is now pending for a line from Mush Creek to Lance Creek, joining the Rocky Mountain pipe line to Cheyenne and Denver.

Sinclair Wyoming Oil Co. is now completing its Wertz field deepening at 22 Unit, CEL SE SE 1-26n-90w, Sweetwater County, Wyoming, as a new pay discovery in the Amsden formation. This well is of importance not only as a discovery but also as the first commercial completion in the Amsden in the state. The well was a deepening from the Tensleep, where it was completed several years ago. The well is at 6,635 ft., total depth, with 5½-in. casing cemented at 6,633 ft. Casing is now being perforated opposite the basal Amsden sand between 6,500-6,600 ft. On drill-stem test 6,508-55 ft. the well flowed at the end of 45 minutes and made 35 bbl. of 35°-gravity oil in 45 minutes.

On another test 6,555-94 ft. there was a slight blow in 3 hours and the recovery was 470 ft. of oil and 330 ft. of mud-cut oil in 4 hours through ¼-in. choke. Original objective of the test was the Madison but this horizon will be tested in another well to be drilled soon. Recently Sinclair made a Madison discovery in Lost Soldier field, 3 miles west of Wertz, and this well also found saturation in the basal Amsden sand, but this horizon was not produced.

An interesting wildcat on the west side of Green River Basin at Little Round Mountain is now being abandoned by Union Oil Co. and Carter Oil Co. The well is 1 Government, NW NW NE 30-20n-115w, and is at 6,155 ft., total depth. No important shows were encountered in the wildcat and it was in the Weber formation at total depth. Three times the well crossed faults in the Permian and Pennsylvanian sections. The well was of importance as the first deep test along the thrust-fault belt extending north and south through this area.

Mountain Fuel Supply Co. is now drilling below 7,605 ft. at the wildcat test of the Last Chance structure in Emery County, Utah. The well is now below contract drilling depth, with no report by the operator of formation tops or tests made on the well. The test is 1-A Unit, NW SE NW 18-26s-7e, in the south-central portion of the state, and is one of the most im-

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portant wildcats now being drilled in Utah.

New operations.—There were 12 new locations in the Rocky Mountains this week, with 8 in Wyoming, 1 in Colorado and 3 in Montana. One of the Wyoming locations was another extension test on the south side of Elk Basin field by Carter Oil Co. at 9 Johnson-Watson, NE SW SE 8-57n-99w, Park County. This well is ¼ mile east of a recent extension by the company which is now being completed as a Tensleep producer. The new test will also be drilled to Tensleep. Location has been made by General Petroleum Corp. for an extension test on the north side of the Sand Creek unit, Washakie County, Wyoming, at 63-2-G, NE SW SE 2-46n-91w. This well is 4 miles north of the Frontier sand pool discovered by the company last year, where three wells have been completed as producers, making approximately 800 bbl. of oil daily. The Sand Creek field has not been tested below the Frontier, although General Petroleum has production in the Phosphoria (Embar) at South Fork, 4 miles west of Sand Creek, at depths below 10,000 ft. The present semiwildcat may also be drilled to the Embar and possibly to the Tensleep formations.

Completions.—There were only eight wells completed this week with a total initial production of 428 bbl. of oil. Four of the wells were in Colorado, two in Wyoming and two in Montana. Continental's extension failure at Elk Springs, Moffat County, Colorado, was a failure in the Weber. The well was 3 Smith, SW NE SW 30-5n-98w, ¼ mile north of the discovery well. The test was drilled to 6,656 ft., total depth, with Weber at 6,570 ft., and the well tested sulfur water from that formation. The well is believed to have crossed a fault as Weber was 250 ft. lower in the test than in the discovery well, and 320 ft. lower than in Continental's second producer on the structure. A fourth well in the SW NE SE of the same section is now being drilled.

Ohio Oil Co. and others have abandoned the deep test at Porcupine, Rosebud County, Montana, at 1 Northern Pacific Railroad, NW NW NW 9-10n-39e, at 6,058 ft., total depth. The well topped Cambrian at 5,084 ft., and at total depth may have reached granite. This is the first deep test for this structure, which is one of the largest in the state. Flowing water was found in the Amsden and the Madison and no shows of oil or gas were reported for the well. It is rumored that another well may be drilled on the structure by the operator, but this is not confirmed. Other completions in Wyoming, Colorado, and Montana were pool wells.

MONTANA WILDCAT FAILURE

Porcupine Dome, Rosebud County: Ohio et al 1 N.P.R.R., NW NW NW 9-10n-39e, 6,058 TD, abdn., Muddy 1,175, Dakota 1,280, Morrison 1,450, Ellis, 1,980, Chugwater, 2,060, Amsden 2,303, Madison 3,588, Cambrian 5,084, elev. 2,906 ft. gr.

LA.-ARK.

Deep Tests in Claiborne And Cotton Valley

SHREVEPORT.—Carter Oil Co.'s deep test in Claiborne Parish, the 1 Gandy, 28-19n-7w, squeezed all perforations and drilled out to 11,000 ft. New shots were placed from 10,847 to 10,996 ft. First drillstem test of the new perforations failed due to mechanical difficulties and operators were preparing to retest.

Union Producing Co. 3 Durrett, 31-20n-5w, was drilling below 11,581 ft. in the Cotton Valley. Maritzky & Bibby 1 Richardson is a new Clinton operation in 23-22n-6w. Drilling was under way below 975 ft. on the first report.

In DeSoto Parish, The Texas Co. 1 Rambin, 23-11n-11w, was drilling ahead below 5,838 ft. in shale and limestone after showing for distillate production last week. It is said to be running 75 ft. higher than Superior Oil Co. 1 Mansfield Hardwood Lumber Co. in NE NW 24-11n-11w. Electric log tops were: Austin 2,510-2,630 ft., Fredericksburg 2,753 ft., Paluxy 2,790 ft., Massive anhydrite 4,800-4,906 ft., on elevation of 140 ft.

In Lincoln Parish The California Co. 1 Hood Unit B-28, 11-19n-4w, was drilling at 8,037 ft. in an unidentified formation. California 1 Nobles Unit B-32, 13-19n-4w, was below 8,663 ft. It cored the Bodcaw between 8,613-39 ft., with no shows. Carter Oil Co. 1 Matthews, 22-18n-4w, was drilling below 8,581 ft. in sandy shale.

A return to normal activity was indicated in Arkansas operations. In Columbia County, Lee & Burnett 1-A Thomas, 4-16s-19w, had total depth at 3,260 ft., and was waiting on orders after running electric survey. O'Meara et al 1 Moody, 12-16s-22w, had total depth at 7,243 ft., in the Smackover, and was preparing to drill out. Peterson Drilling Co. 1 Curry, 5-16s-19w, was coring at 2,224 ft.

In Hempstead County, El Capitan Oil Co. 1 Avery, 4-11s-23w, was running electric survey to 905 ft., total depth. Caddo Oil Co., Inc., 1 Christopher, 9-11s-22w, Nevada County, had total depth at 3,847 ft. in the Eagle Mills formation and was waiting on orders. White & Cames 1 Rumph

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& Levy, 7-14s-18w, Ouachita County, was drilling below 1,210 ft. Sample top on the Midway was reported at 740 ft. In Saline County, Fitzwater et al 1 Malvern Lumber Co., 12-3s-16w, was drilling ahead after setting surface casing. Mul-Berry Oil Co. 1 Martin, 25-18s-15w, Union County, had total depth at 2,160 ft. in the Nacatoch, and was waiting on standard rig, at last report.

Completions in North Louisiana totaled 21, with 17 oil, 1 gas and 3 dry holes. The Caddo field reported seven oil wells finished, while the Ora field had six producers and one dry. Big Creek and Delhi had one oil well completion each, and Lake St. John had one oil well and one distillate. The Ora field headed the list in new work, having 4 of 10 first reports during the week. One new well was reported in each of the following fields: Sligo, Caddo, Lisbon, Logansport, Summerville, and Delhi.

NORTH LOUISIANA WILDCAT FAILURE

Tensas Parish: Roy L. Fisher et al 1 W. R. Wright, E½ NE NW 22-10n-9e, dry, TD 5,015 ft., Cockfield 1,052 ft., Crook Mountain 1,707 ft., Sparta 1,882 ft., Cane River 2,818 ft., Talahatta 3,128 ft., Wilcox 3,290 ft., elev. 72 ft.

ILLINOIS

Prospects For Good Wells in Clay County

MATTOON.—In the Hoosier, North section, about 5 miles southeast of Bible Grove, Ill., the N. V. Duncan 1 Cook, NE NW SE 35-5n-7e, Clay County, has opened a new pay for the area. The well was drilled to 2,966 ft. and casing set on the McClosky, 2,953-56 ft. A drill-stem test got gas in 8 minutes and clean oil in 58 minutes.

Also in Clay County in the area east of the Sailor Springs Consolidated and north of Clay City Consolidated, the Wiser Oil Co. 1 Lillie Hunley, SW NE NE 8-3n-8e, swabbed 120 bbl. in 2 hours after perforating the Rosiclare at 3,009-15 ft. The well, not yet acidized, is shut down because of road conditions.

Three other good producers were completed in Clay County last week. The Ashland Oil & Refining Co. 4-B L. F. Brissenden, NE SW NW 9-3n-7e, was completed in the McClosky for 456 bbl. per day. The J. L. Black 3 V. Iffert et al, NE NE SE 11-4n-8e, has an initial production of 400 bbl. per day from the McClosky, and the J. L. Black 2 Carl Buester, NW SW NW 12-4n-8e, was completed in the McClosky for 150 bbl. per day.

ILLINOIS WILDCAT FAILURES

Effingham County: A. J. Hammer 1 Voories, SE NE SW 34-8n-6e, dry, TD 2,575 ft.

Marion County: John Booth 1 N. Green, NE SW SE 13-4n-2e, dry, TD 3,633 ft.

Richland County: Sohio Petroleum 1 G. W. Hill, SE SE NW 2-4n-10e, dry, TD 3,110 ft.

Montgomery County: O. A. Ried 1 W. E. Hitchings, NW SW SW 16-10n-4w, dry, TD 760 ft.

Hamilton County: Oil Management 1 Leach and Fuhrer, NE NE NE 1-4s-6e, dry, TD 3,492 ft.

Gallatin County: Sohio Petroleum 1 Downen, NE NE SW 30-7s-9e, dry, TD 3,141 ft.

Pike County: Panhandle Eastern Pipe Line Co. 1 Mumford, NE NE NW 21-5s-4w, dry, TD 2,226 ft.

Wayne County: National Associated 1 Tadlock, NE NE SE 36-2n-5e, dry, TD 3,083 ft.

R. P. Johnson 1 C. R. Stein, SW SW NE 17-1n-8e, dry, TD 3,112 ft.

Collins Brothers 1 Allison, C-SE NE 4-1s-9e, dry, TD 3,477 ft.

Netherlands Takes Oil Spotlight in Review

(Continued from page 48)

matra fields got under way for the first time since the war last October, producing around 40,000 bbl. daily, 50 per cent of which is being refined in Standard-Vacuum Petroleum Mij.'s Palembang refinery and an equal amount in the Royal Dutch-Shell's Baatsche Petroleum Mij.'s refinery at Panklon Brandan. The fields in central and northern Sumatra have not been reentered, due to the unsettled political situation. Daily prewar crude-oil production in north Sumatra, approximated 40,000 bbl.

The probable oil reserves in central and south Sumatra are among the most important in the Far East, according to E. W. Berlin, production executive of Standard-Vacuum, who presented the Far East information to A.I.M.E. members.

At Tarakan, the daily production at the end of 1947 approximated 5,800 bbl. daily, compared with the 1938 level of 14,000 bbl. daily. In South Borneo, production at Balikpapan was back to 10,000 bbl. daily at the close of 1947.

In South Borneo's Amoentai block, in the Bandjermesin Basin, Shell is carrying out an exploratory program. Some wells were drilled there before the war. At Miri and Seria, in British North Borneo, rehabilitation got under way and by the end of last year production had reached approximately 48,000 bbl. daily.

On Java, Shell has regained a small portion of its prewar production, but unsettled political conditions have precluded any major activity.

In Burma, crude-oil production was limited to the requirements of small domestic topping plants for local needs. Total 1947 production was estimated at 200,000 bbl. Reconditioning of equipment occupied the operators last year, and, as of early 1948, indications were that new drilling would resume.

In India, geophysical parties were testing areas to the west of holdings in Digboi field. Preparations were under way for drilling. In Pakistan production in the Khaur and Dhulian fields, in the Punjab district, was down. However, the country's production was supplemented by production from the Chakwal fields (Joya Mair and Balkassar). An estimated 400,000 bbl. daily was produced in 1947 in Pakistan. In western Pakistan, geological and geophysical parties continued with their operations. Some drilling was carried on by Burmah Oil Co., Ltd., and Attock Oil Co., Ltd.

Crude-oil production in China remains at approximately 1,000 bbl. daily from Kansu field. All is refined in small topping plants and used locally.

In Australia, geological parties are operating on the mainland of the desert basin in the northwest.

Shell Oil Co. Issues Booklet Explaining Economic System

Another forward step in explaining the problems of the American economic system in general, and of the petroleum industry in particular, has been taken by Shell Oil Co., Inc., in the distribution of a new booklet entitled "Pete Is a Prime Mover."

"Pete" is an animated oil droplet representing the petroleum industry and is shown from the time he leaves the ground until final consumption. The relationship between our democratic form of government and the United States economic system is explained, and it is shown how the latter functions through development of mass production, mass sales, and multiple ownership.

H. L. Curtis, assistant to Shell's president, under whose direction the booklet was prepared, states that "the recent course of events has convinced many businessmen that they have done a better job of selling their products and services than of 'selling' an understanding of the business system itself."

Bill Extending U.S.M.C. Authority Given Truman

WASHINGTON.—Congress last week sent to the White House for presidential approval legislation extending unitl March 1, 1949, the authority of the Maritime Commission to charter and operate surplus ships, with a specific provision that no ships shall be chartered to foreign operators and no further sales of vessels shall be made after this month.

Effect of the legislation will be to permit the commission to continue its general agency agreements to keep Government-owned tankers in domestic service until transfer of title are made under sales previously agreed upon.

Canadian Gas Production Shows Big Gain in 1947

OTTAWA, Canada.—Natural-gas production in all Canadian fields in 1947 totaled 55,414,610 M.c.f. against 47,900,484 M.c.f. in 1946. Every month in the year showed an increase.

Alberta fields accounted for the major part of the production with 46,227,568 M.c.f. Ontario ranked second with 8,516,388 M.c.f. New Brunswick produced 489,602 M.c.f. and Saskatchewan, 181,052 M.c.f.

STATISTICS and

WEEKLY WELL COMPLETIONS . . . WEEK ENDED FEBRUARY 28, 1948

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1948				
	Comp.	Oil	Gas	Dry	Footage	1948	1947	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	22	11	0	*11	22,156	266	240	0	0	0	0	0	0	0	0	0	0
Pennsylvania	42	19	4	†19	72,912	497	554	0	0	0	0	0	0	0	1	10	11
West Virginia	12	0	11	1	29,783	119	145	0	0	2	0	2	0	0	11	13	24
Ohio	17	4	4	‡9	44,947	183	210	0	0	0	0	0	1	0	2	5	8
Indiana	23	11	2	§10	41,027	156	64	0	0	0	0	0	1	0	0	1	2
Kentucky	10	2	5	3	17,032	110	64	0	0	0	0	0	1	0	0	3	4
Illinois	46	24	0	22	118,974	352	319	0	0	0	10	10	8	0	0	59	67
Michigan	12	5	0	7	37,629	125	111	1	0	0	5	6	5	0	3	48	56
Kansas	41	19	2	20	124,583	464	442	0	0	0	5	5	7	0	1	56	64
Neb., Mo., Iowa	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Oklahoma	59	26	4	¶29	218,093	616	683	2	0	0	12	14	21	0	6	108	135
Texas	156	95	8	53	724,498	1,676	1,307	3	0	2	31	36	52	5	14	318	389
North Central (Dist. 7-B & 9)	36	19	1	16	136,841	491	422	1	0	0	8	9	22	0	2	106	130
West (Dist. 7-C & 8)	34	27	1	6	146,287	443	323	0	0	0	3	3	9	0	0	30	39
Panhandle (Dist. 10)	12	7	4	1	35,653	93	76	0	0	1	0	1	0	0	1	0	1
Eastern (Dist. 5 & 6)	10	6	0	4	61,037	92	78	0	0	0	4	4	3	0	0	30	33
Gulf Coast (Dist. 2 & 3)	21	17	0	4	146,675	277	253	2	0	0	3	5	12	4	3	72	91
Southwest (Dist. 1 & 4)	43	19	2	22	198,005	280	155	0	0	1	13	14	6	1	8	80	95
Louisiana	30	25	1	4	142,341	292	199	2	1	0	1	4	7	3	1	25	36
Northern	21	17	1	3	64,042	186	100	0	0	0	1	1	0	0	0	13	13
Southern	9	8	0	1	78,299	106	99	2	1	0	0	3	7	3	1	12	23
Arkansas	8	8	0	0	31,834	67	34	0	0	0	0	0	1	0	0	18	19
Mississippi	10	5	1	4	86,254	70	54	0	0	0	2	2	2	0	0	14	16
Southeastern States	1	0	0	1	4,235	7	9	0	0	0	1	1	0	0	0	6	6
Montana	2	1	0	1	8,093	39	27	0	0	0	1	1	1	0	0	7	8
Wyoming	2	2	0	0	8,859	63	43	0	0	0	0	0	3	0	0	6	9
Colorado-Utah	4	2	0	2	20,696	47	23	0	0	0	0	0	0	0	0	7	7
New Mexico	8	7	1	0	42,799	97	85	1	0	0	0	1	2	0	0	4	6
California	68	57	1	10	243,224	447	331	2	0	0	7	9	3	0	0	49	52
Total United States	573	323	44	206	2,039,969	5,693	4,945	11	1	4	75	91	115	8	39	757	919
Total previous week	564	320	43	201	2,091,888	5,120	4,403	14	1	5	77	97	104	7	35	682	828
Total March 1, 1947	542	285	60	197	1,956,017			9	1	0	76	86	93	9	23	638	763

Service well included: *11, †19, ‡2, §3, ¶1.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$2.17	....	....	....
19-19.9	2.19	....	....	....
20-20.9	2.21	$2.25	....	$2.12
21-21.9	2.23	2.27	....	2.14
22-22.9	2.27	2.29	....	2.16
23-23.9	2.30	2.31	....	2.18
24-24.9	2.34	2.33	$2.56	2.20
25-25.9	2.38	2.35	2.58	2.22
26-26.9	2.41	2.37	2.60	2.24
27-27.9	2.45	2.39	2.62	2.26
28-28.9	2.49	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.56	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.62	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point. †Includes Lea County, New Mexico.

A.P.I. REFINERY REPORT, WEEK ENDED FEBRUARY 21

District—	Crude runs, daily avg.	(Thousands of barrels) Production: Gasoline†	Kerosine	Gas & dist. oil	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	843	1,945	349	1,423	1,852	22,113	3,383	7,602	6,811
Appalachian:									
District 1	93	280	47	94	94	2,163	188	338	333
District 2	75	239	28	87	122	1,208	110	220	113
Ind., Ill., Ky.	834	2,679	454	1,005	1,187	20,548	1,671	4,129	3,768
Okla., Kans., Mo.	437	1,509	185	549	516	10,592	472	2,053	1,384
Inland Texas	240	1,010	95	174	440	4,296	213	319	814
Texas Gulf Coast	1,347	3,840	804	2,491	1,719	20,434	1,434	5,046	6,335
La. Gulf Coast	427	1,194	388	730	588	6,090	942	1,711	1,761
N. La. and Ark.	79	192	63	85	127	2,148	335	440	213
Rocky Mountain:									
New Mexico	11	30	4	10	22	108	25	16	31
Other Rocky Mtn.	147	467	34	187	357	2,969	122	669	702
California	866	2,422	69	1,292	2,175	17,217	836	11,461	27,517
Feb. 21, 1948	5,399	15,807	2,520	8,127	9,199	109,886	9,731	34,004	49,782
Feb. 14, 1948	5,378	15,429	2,508	7,694	8,742	107,763	10,408	36,195	50,038
Feb. 22, 1947	4,858	14,666	2,335	5,890	8,658	101,832	11,629	39,929	44,037

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 219,314,000 bbl. as of February 21—up 752,000 bbl. One year ago 224,580,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.

East Texas	$2.65
Kettleman Hills, California*	2.14
Beauregard Parish	2.86
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	5.00
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

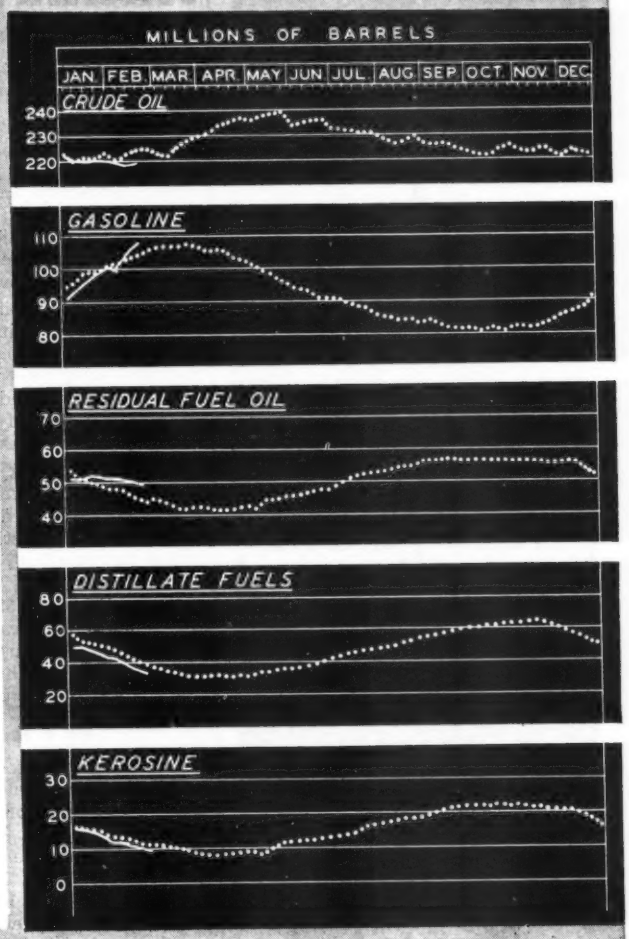
	Feb. 28 crude oil	B. of M. Feb. demand	Feb. 21 crude oil
Alabama	1,300	1,500	* 1,350
Arkansas	86,650	82,000	86,500
California	936,100	930,000	932,800
Colorado	47,300	47,000	46,880
Eastern	64,970	64,900	62,700
Florida	775	1,000	800
Illinois	174,300	182,000	174,800
Indiana	17,600	16,000	18,300
Kansas	299,000	305,000	261,650
Kentucky	26,400	26,000	27,000
Louisiana	475,650	465,000	474,950
North Louisiana	122,400	.....	121,700
South Louisiana	353,250	.....	353,250
Michigan	47,300	45,000	46,800
Mississippi	119,475	112,000	115,625
Montana	24,680	24,000	24,870
Nebraska	500	600	500
New Mexico	125,000	125,000	125,000
Oklahoma	408,950	410,000	410,000
Texas	2,432,825	2,360,000	2,432,825
Dist. 1 (Southwest)	25,700	.....	25,700
Dist. 2 (Southwest)	172,100	.....	172,100
Dist. 4 (Southwest)	254,675	.....	254,675
Dist. 3 (Gulf Coast)	498,450	.....	498,450
Dist. 5 (Eastern)	44,325	.....	44,325
Dist. 6 (Eastern)	122,500	.....	122,500
East Texas Field	315,000	.....	315,000
Dist. 7-C (West)	44,350	.....	44,350
Dist. 8 (West)	678,850	.....	678,850
Dist. 7-B (W. Central)	45,100	.....	45,100
Dist. 9 (N. Central)	145,425	.....	145,425
Dist. 10 (Panhandle)	86,350	.....	86,350
Wyoming	137,850	134,000	135,970
Total United States	*5,426,625	5,331,000	5,379,320
Change from prev. wk., up	47,305		

Total production January 1-February 28 . . . †319,099,130 bbl.
Same period last year (crude plus cond.) . . 279,284,460 bbl.

*Not incl. 52,135 bbl. condensate. †Incl. 2,930,380 bbl. condensate.

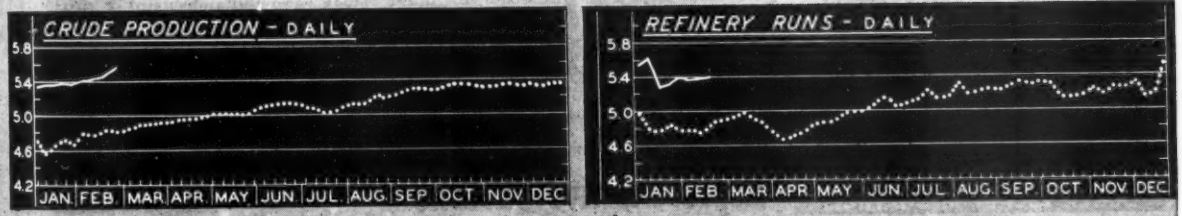
STOCKS IN UNITED STATES

---- 1947 ——— 1948



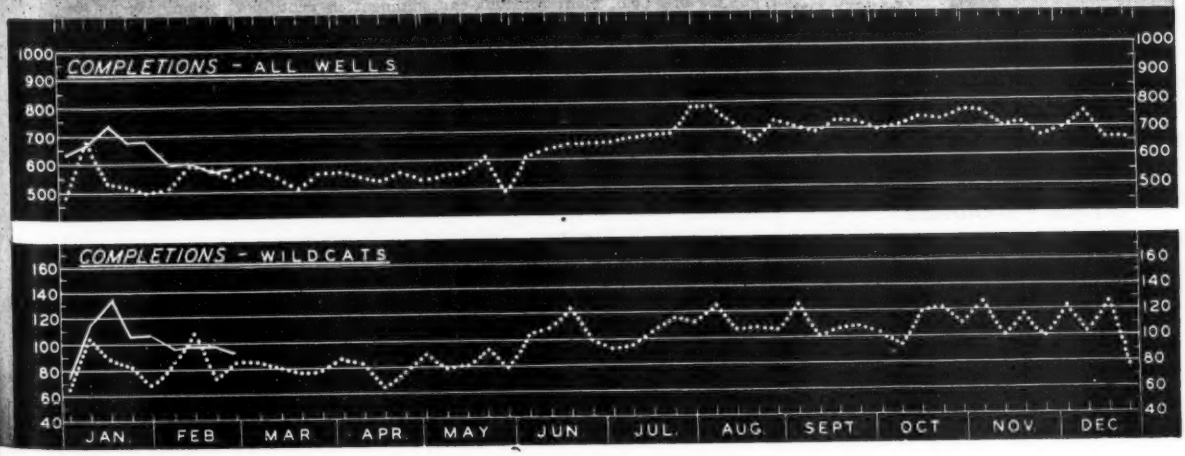
DAILY OPERATIONS

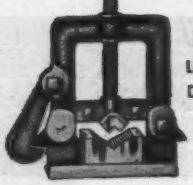
---- 1947 ——— 1948



WEEKLY COMPLETIONS

---- 1947 ——— 1948





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PERRY, OKLAHOMA

MARKETS

ALONG the Eastern Seaboard products prices generally remained unchanged. Transportation has eased to the point where it is no longer a serious problem, insofar as the East's heating oil supply is concerned.

All indications are that barring severe weather, and with continued consumer cooperation, the industry will be able to meet demand for the remainder of the winter.

District 1's refining subcommittee, head by D. J. Smith of Pan American Petroleum Co., reports having received telegrams from refiners indicating that an additional 3,000,000 to 4,000,000 bbl. of urgently needed heating oil and kerosine will be available.

In the Mid-Continent area two marketers advanced their No. 6 residual oil price postings to $3.20. Demand for gasoline and burning oils remained strong. A ½ cent per pound decrease for 130-132 A.S.T.M. melting point crude scale wax was announced by one large Mid-Continent supplier, making the new price listing 8¾ cents per pound.

No. 6 at $3.00

One seller reported moving 20 cars of No. 6 residual at $3.00 per barrel late last week in buyers' cars and in the previous week had moved more than 60 cars at the same price. Several cars of No. 2 burning oil were reported sold at 14 cents, buyers' cars. Several marketers said that little change has been apparent in the tank-car situation. One observer noted that faster "turnarounds" of tank cars would accompany milder weather.

Some housebrand gasoline was reported by one marketer to have moved at 12¼ cents, while premium gasoline was bringing 13¼ cents, both products in buyer's cars.

One shipper predicted that another week of milder weather would bring a leveling off followed by a downward trend of prices for No. 2 because "demand hysteria" from a few local areas would fall off sharply. Any falling off of demand for No. 2 will be quickly followed by a strong demand for gasoline and tractor fuels, said one observer. The strongest gasoline "pinch" expected by some sources will be most critical in the north central states.

Gulf Demand Softening

On the Gulf Coast some slight easing in the heretofore extremely heavy demand for light burning oils was reported in independent marketing circles. Though not as yet reflected to any extent in spot-market prices, softening in kerosine and No. 2 was noted. One marketer said he had received cancellations for orders for these two products in the Southeast section where apparently major-company allocations are meeting demand and premium-priced material is not needed in as large a quantity as previously.

Supply also appeared to be better meeting demand in heavy industrial fuel oil, and prices were off about 25 cents per barrel from the previous top of $3.50 for open-market purchases. Tank-car No. 6 was moving at prices around $2.90 per barrel.

Reflecting seasonal conditions and storage demand for summer, gasoline was reported increasingly difficult to find. Inquiries from foreign buyers also were said to be picking up. These sought particularly light products for movement under Department of Commerce license.

Representative Quotations

Representative spot-market quotations of leading suppliers as of March 1, 1948. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	10½-11½	11.6-12* 10.5-12.2†	10.9-12.5
Premium gasoline, 78-80 octane	11¾-12½	10.6-13.4	12.9-13
42-44 w.w. kerosine	10-10½	10.2-12.2	10¼-12.5
No. 2 straw fuel oil	9½-11	9.3-11.1	9.05-12
No. 6 residual	$2.50-3.20	$3.03-3.90	$2.56-3.25

*Branded (74-76 octane); †Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	8½	8	8¼
Grade 18-55	10.2	9.8	9.9

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13-14.5
750 vis., No. 3-4 neutral	15-17.25
2,000 No. 5-6 neutral	17-18½

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	30-32
200 vis. No. 3 neutral, 0-10 pp.	20-21

Western Pennsylvania

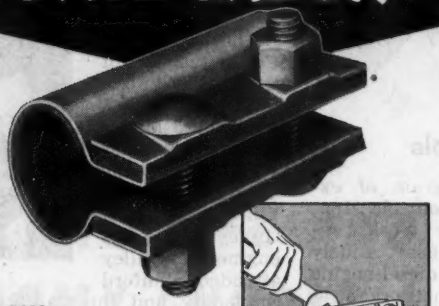
145-155 vis. 10 p.t. bright stock	47
180 vis. p.t. neutral	48

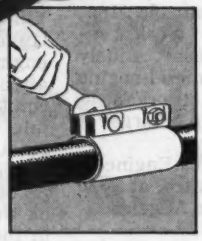
CRUDE-SCALE WAX

Mid-Continent

130-132 A.S.T.M. melting point	8½-8¾

SAVE COSTS SAVE TIME SAVE LABOR





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NOW you can join pipe without threading or special preparation with Morris *Gasket Sealed* couplings . . . eliminate unions, collars and welding. Installations become a single wrench, one man job. Morris couplings provide smooth, unobstructed flow through line . . . are efficient on plain or threaded pipe.

MORRIS Couplings and Clamps guarantee lowered costs . . . greater safety . . . longer service. Specially processed electro-galvanized steel gives strength and rust resistance much greater than ordinary pipe. Light weight . . . plus simplicity of design . . . saves in application and transportation.

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Couplings . . . 1000 lbs. per square inch

Dead-End Pressure on Unanchored Pipe

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EQUIPMENT MEN ... in the News

New President For Fred E. Cooper, Inc.

H. E. COOPER

Harold E. Cooper, a vice president and director of Fred E. Cooper, Inc., Tulsa, has been elected president of this concern. He succeeds his uncle, Fred E. Cooper, who died in an airplane accident on February 6. The board of directors of the corporation elected J. W. Allen to the board and named him vice president of the organization. Allen has been associated with the corporation since 1928. He will continue to be manager of manufacturing.

Howard B. Appleton was made secretary-treasurer, formerly having been secretary. H. B. Bloxom is sales manager of the company.

General offices and manufacturing plant of Fred E. Cooper, Inc., are located in Tulsa. Branch plants are maintained in Houston, and Los Angeles, Lynnewood, Calif.

Timken Makes Bearing Division Changes

Officials of Timken Roller Bearing Co. have announced five Bearing Division organizational changes as follows:

Blair Glenn, general superintendent of the Canton bearing division, has been promoted to assistant factory manager of the Canton bearing division.

Henry Tobey, Canton bearing factory metallurgist, has been appointed general superintendent of the Canton bearing factory succeeding Glenn.

Fred Barnard, assistant Canton bearing factory metallurgist, has been appointed Canton bearing factory metallurgist succeeding Tobey.

Joseph Selby, has been appointed assistant Canton bearing factory metallurgist succeeding Barnard.

Russell P. Fowler, assistant general superintendent of the Columbus plant, has been appointed superintendent of the Bucyrus bearing factory, where operations are scheduled to begin early this spring.

Daniel Shoots Ace

Paul Daniel, president of Daniel Orifice Fittings Co., 3352 Union Pacific Avenue, Los Angeles, is walking on air these days. He scored a hole-in-one on the 181-yd., fifth hole of the San Gabriel Country Club, San Gabriel, Calif.

Bohuslav Joins Engineering Controls

In line with its program of expansion, Engineering Controls, Inc., Los Angeles and New York, announces that Hans Bohuslav, widely known gasoline and diesel-engine authority, has joined that organization as vice president in charge of engineering.

Home office and plant of Engineering Controls, Inc., is located at 2835 East Eleventh Street, Los Angeles.

New D+B Chief Engineer

Emsco Derrick & Equipment Co., announces the appointment of David A. Carnahan as chief engineer of the D+B Division of the company. Carnahan attended Stanford University where he graduated with an engineering degree. Following graduation, he worked in practically every field in California. Prior to the war he was affiliated with D+B in the engineering department. During the war, he was a lieutenant in the Navy, specializing in ordnance research and development. He spent 10 months overseas and upon his return was in Washington for 7 months teaching bomb disposal. He was then sent to Inyokern, Calif., Naval Ordnance test station, rocket development station. In his new capacity as chief engineer for D+B, he will supervise the development and engineering of subsurface equipment at both the Dallas and Los Angeles plants.

Air Reduction Advances Two

Dale D. Spoor has been appointed sales-promotion manager of Air Reduction Sales Co., New York. Russell S. Schmidt succeeds Spoor as dealer sales manager. As sales-promotion manager Spoor's duties will include the supervision of a sales training program, and, the establishment of sales-promotion programs for the various Airco sales districts throughout the country.

Gulley Joins Rockwell

The Pacific Coast district of the Nordstrom Valve Division, Rockwell Manufacturing Co., has announced the employment of William F. (Bill) Gulley as sales engineer. Gulley attended Stanford University and the California Institute of Technology where he was graduated with the degree of bachelor of science in mechanical engineering. At both Stanford and California Tech he was active in athletics and starred in football. During the war he spent 3 years in the Navy in an engineering officer capacity aboard an aircraft carrier.

He will operate from the Los Angeles district office.

Brown Oil Tools Adds Dallas

Brown Oil Tools, Inc., Houston, has added Fred W. Dallas, Jr., to its Houston city sales force. Dallas studied mechanical engineering at Georgia Tech before joining the Army Air Corps in 1939, where he served until 1945, being relieved from active duty with the rank of major.

For 2½ years before joining Brown Oil Tools Dallas was director of training for Shell Pipe Line Corp. In addition to his sales activities in Houston Dallas will make occasional trips for the company into the South Texas and Louisiana areas.

Le Roi Appoints Heuser

J. E. HEUSER

John E. Heuser has been appointed assistant sales manager of Le Roi Co., Milwaukee. Heuser is a graduate engineer from University of Wisconsin with over 9 years of sales experience. During the past 3 years he has handled much of the sales administration for both Le Roi engine and compressor products. Prior to coming to Le Roi Co., Heuser was district manager for a large bronze foundry. He will take over many of the duties of

(Continued on page 139)